

NOTICE

All drawings located at the end of the document.

Rocky Flats Environmental Technology Site Action Levels and Standards Framework for Surface Water, Ground Water, and Soils

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1.0 GENERAL BACKGROUND

1.1 Goal of Action Levels and Standards Framework

A working group consisting of the Department of Energy (DOE), the Environmental Protection Agency (EPA), the Colorado Department of Public Health and Environment (CDPHE), and Kaiser-Hill teams was formed to develop a consensus proposal for the appropriate cleanup standards and action levels that should apply to the Rocky Flats Environmental Technology Site (RFETS). This Action Levels and Standards Framework for Surface Water, Ground Water, and Soil (ALF) presents the final recommendation of the Working Group, incorporates comments from stakeholders, and is summarized in Summary Table 1. It has been developed in a manner generally consistent with the Rocky Flats Vision (Vision) and Rocky Flats Cleanup Agreement (RFCA) Preamble Objectives. In some cases, the working group found it necessary to more precisely define aspects of the objectives so that applicability of action levels and required mitigating actions could be completely defined.

The goal of the ALF is to:

- provide a basis for future decision-making;
- define the common expectations of all parties; and
- incorporate land- and water-use controls into Site cleanup.

Five future conceptual land uses have been determined for the purpose of making cleanup decisions. Their approximate areal extents are delineated on the map attached to this document as Figure 1. These land use areas include: (1) potential capped areas underlain by either waste disposal cells or contaminated materials closed in-place; (2) an industrial use area; (3) a restricted open space area; (4) another restricted open space area with low levels of plutonium contamination in surface soils; and (5) an unrestricted open space area that, while it would be managed as open space, actually could be available for any use. The capped areas on Figure 1 are proposed and will be finalized in an RFETS Closure Plan. At that time, the capped areas shown on Figure 1 not under an RFETS Closure Plan cap will be considered restricted open space.

This document describes action levels, cleanup levels, put-back levels, and standards. Action levels are numeric levels that, when exceeded, trigger an evaluation, remedial action, and/or management action. Action levels will remain in effect and guide removal actions and other remedial efforts during the period of active remediation. For interim remedial actions, interim cleanup levels will equal Tier I action levels unless some other

ALF provision requires a greater level of cleanup (e.g., protection of surface water). Following implementation of interim actions, final remedial/corrective action decisions, including final cleanup levels will be determined in a Corrective Action Decision/Record of Decision (CAD/ROD). The final remedial/corrective actions specified in a CAD/ROD may require additional work based on the final cleanup levels to ensure an adequate remedy.

A standard is an enforceable narrative and/or numeric restriction established by regulation and applied so as to protect one or more existing or potential future uses. Within this framework, standards are associated with surface water use classifications and applied at points of compliance (POCs). Standards are not being directly applied to ground water or soils. Closure performance standards apply to Resource Conservation and Recovery Act (RCRA) units.

Put-back levels are those levels at which excavated soils will be allowed to be replaced back into the ground. For non-radionuclide chemicals, put-back levels are equivalent to interim cleanup levels. Soils with radionuclide levels below Tier II action levels may be replaced; soils containing radionuclide levels above Tier I action levels may not be replaced. Decisions regarding soils containing radionuclide levels between Tier I and Tier II will be determined on a case-by-case basis. Because many of the variables used to determine put-back levels are project-specific, put-back level decisions should be made and explained within the decision documents associated with those actions. Decision factors to be considered include remedy effectiveness and protectiveness, anticipated future land uses, contaminant levels in surrounding soils, potential for contaminants to affect surface water quality, and costs.

Action levels for non-radionuclide chemicals are risk-based and chemical risk is considered additive when multiple chemicals are present. Radionuclide action levels are dose-based and radiation dose is considered additive when multiple radionuclides are present. Radionuclides and non-radionuclides will be assessed independently on a project-specific basis using methodology that is protective of human health and the environment. The cumulative effects of radionuclides and non-radionuclide chemicals will be assessed on a project-specific basis if the chemical risk and/or radiation dose are near their respective Tier I action levels.

1.2 Programmatic Assumptions

The working group developed this framework using the following inter-related

programmatic or Site-Wide assumptions:

- The framework must be consistent with the Vision and RFCA Preamble;
- Implementation of the framework must protect human health and the environment;
and
- Implementation of the framework must protect surface water uses and quality.

1.3 Action Prioritization and Implementation

Remedial decisions will be supportive of Intermediate and Long-Term Site Conditions as discussed in the RFCA Preamble. Protection of all surface water uses with respect to fulfillment of the Intermediate and Long-Term Site Conditions will be the basis for making soil and ground water remediation and management decisions. Actions will be designed to prevent adverse impacts to ecological resources and ground water consistent with the ALF. Because the ALF does not address the inherent value of ground water, any residual effects on ground water not addressed through this Framework will be addressed under a Natural Resources Damage Assessment (NRDA).

Actions required as a result of exceedances of the standards or action levels described in this document will be prioritized on the Environmental Restoration (ER) Ranking. The ER Ranking will, in turn, be considered in the Budget and Work Planning Process (RFCA, Part 11). These interim remedial decisions may be implemented by means of an accelerated action (Proposed Action Memorandum [PAM], Interim Measure/ Interim Remedial Action [IM/IRA], or RFCA Standard Operating Protocol [RSOP]) or addressed as necessary in the CAD/ROD for the affected area. Actions will be developed in an integrated manner with other actions being taken and will be consistent with best management practices.

2.0 SURFACE WATER

2.1 Basis for Standards and Action Levels

Protection of surface water will be a basis for making interim soil and groundwater cleanup and management decisions, so that at the completion of all cleanup activities, surface water leaving RFETS should be of sufficient quality to support all uses. The surface water standards this framework is designed to protect are found in the WQCC Regulation No. 31: Basic Standards and Methodologies for Surface Water (5 CCR 1002-31) ("Basic Standards") and the site-specific water quality standards in the WQCC Regulation No. 38 (5 CCR 1002-38) ("Site-Specific Standards").

The Colorado Water Quality Control Commission (WQCC) determines water quality standards throughout Colorado. Local municipalities, including Westminster, Broomfield, Thornton, and Northglenn, have been and will be involved and consulted in surface water decisions, including recommendations to the WQCC.

Surface water exists in Areas 2, 3, and 4 on Figure 1, as well as immediately off-site. The standards, action levels, and POCs are based on the following refinement of land uses (assuming current pond water transfer configurations):

- Area 2 (restricted open space) will include all surface water down to, and including, the terminal ponds (Ponds A-4 and B-5) in Walnut Creek. For Woman Creek, only Pond C-2 is in Area 2. Therefore, the surface water in Area 2 is consistent with Segment 5 of Big Dry Creek.
- Areas 3 and 4 (unrestricted open space and restricted open space due to low levels of surficial plutonium contamination, respectively) will include the streams from the terminal ponds to the plant boundary in Walnut Creek and all of Woman Creek except Pond C-2. The surface water in Areas 3 and 4 is part of Segment 4a/4b of Big Dry Creek.

2.2 Numeric Levels During Active Remediation (Near-Term Site Condition)

During the period of active remediation, the Table 1 values will apply as standards in

Segment 4a/4b of Big Dry Creek and as action levels in Segment 5.

A. Non-radionuclides

1. The numeric values that will apply throughout both stream segments are based on Colorado surface water use classifications consistent with the uses described in the RFCA Preamble:
 - Water Supply;
 - Aquatic Life - Warm 2;
 - Recreation 2; and
 - Agricultural.
2. Numeric values will be derived from the following:
 - a. For metals, the site-specific standards or the basic standards apply, except where temporary modifications apply. If the basic and site-specific standards differ for a particular metal, the site-specific standard applies.
 - b. For inorganics, the site-specific standards apply or the basic standards apply, except where temporary modifications apply. If the basic or site-specific standards differ for a particular inorganic, the site-specific standard applies.
 - c. For organic chemicals, the more stringent of the basic standards or the site-specific standards applies, except where temporary modifications apply.
3. Effective March 2, 1997, MCLs were adopted as temporary modifications for six organic compounds in Segment 5. These temporary modifications of surface water standards were granted through the year 2009 by the WQCC and must be re-examined every three years. Other temporary modifications to the numeric values during active remediation may be developed through subsequent working group efforts.
 - a. The basis for proposing the temporary modifications may include one or more of the following:

- A determination of ambient conditions in a manner consistent with the Basic Standards (5 CCR 1002-31);
 - A mass-balance equation that calculates maximum influent concentrations in Segment 5 that will be protective of numeric values at Segment 4a/4b POCs without allowing treatment within waters of the State; and
 - Some other methodology agreed to by all parties.
- b. These temporary modifications should be developed together with other stakeholders (i.e., the local municipalities that are impacted by surface water from the RFETS).
4. Any contamination in surface water resulting from releases from a unit at RFETS subject to RCRA interim status requirements will be addressed through this ALF and through remedial actions rather than through RCRA closure (see Attachment 10 to RFCA, RCRA Closure for Interim Status Units). This would include surface water containing nitrates that has been impacted by the Solar Ponds ground water plume. Addressing the nitrates through this framework will allow these waters to be managed in a more cost-effective and flexible manner. The parties recognize that changes in the management of nitrates may cause the surface water to more routinely approach the current 10 mg/L standard at the POC.
5. Due to detention and batch release operations of Pond A-4 and Pond B-5 waters, exceedance of the numerical pH of 9.00 occurs. Both the wastewater treatment plant effluent and storm water inflows to the ponds have pH values within the numerical range of 6.5 to 9.00 prior to detention in Pond B-5 and A-4; however, the nutrient loading to the ponds promotes algae growth which can shift carbonate equilibria. These conditions cause pH exceedance above 9.00 (with a calculated 85th percentile value of 9.10). All parties agree that aquatic use is likely not impacted by pH exceedances; however, the DOE will strive to control pH in the pond waters through prudent pond water management.

B. Radionuclides

1. Numeric values for plutonium and americium for Segments 4a/4b and 5 are risk-based (10^{-6} increased carcinogenic risks to human health from direct exposure including consumption). These values are the state-wide

basic standards, effective March 2, 1997, as set by the WQCC.

2. Both radionuclides will be analyzed separately, and compared to the numeric value below:
 - 0.15 pCi/L for plutonium and
 - 0.15 pCi/L for americium.

There is no total pCi/L limit.

3. The parties agree that in the event that the plutonium and americium numerical standards are exceeded, the DOE will make every effort to identify the source of the exceedance. This will include documenting: hydrologic characteristics; preventive actions, terminal pond operational parameters; and any abnormal conditions and occurrences. Further, specific decisions regarding the terminal pond operations and the release of water will be guided by the Pond Operations Plan. This plan includes specific responses for identified circumstances and preserves dam safety. DOE shall have the burden to demonstrate prudent pond water management and strive to maintain the lowest detained volume practicable in the terminal ponds.
4. In Segments 4a/4b and 5, numeric values for gross alpha, gross beta, tritium and uranium will be the site-specific standards found in Table 2 of 5 CCR 1002-8-38. Numeric values for radium and strontium are based on the state-wide Basic Standards (5 CCR 1002-31.11). The parties will re-examine these values based upon conditions in the basins and will propose alternative values if appropriate.

C. POCs/Action Level Measuring Points

1. In Segment 4a/4b, POCs will be placed at the existing sampling locations for the outfalls of the terminal ponds (Ponds A-4, B-5, and C-2) in both Walnut Creek and Woman Creek. Additional POCs for plutonium, americium, and tritium will be established near where Indiana Street crosses Walnut and Woman Creeks. In the event that exceedances simultaneously occur for either plutonium, americium, or tritium at both the Indiana Street POC and the associated Terminal Pond POC, then this occurrence will be treated as a single enforcement action. As conditions at the RFETS change, the locations of the POCs may need to change. Such

changes can be made by agreement of the Parties pursuant to Part 9 of RFCA.

2. In Segment 5, exceedance of action levels will be measured in the ponds and upstream in the main stream channel at existing gaging/sampling stations or at additional sampling locations in the main stream channel as necessary.
3. Compliance will be measured using a 30-day moving average for those contaminants for which this is appropriate. When necessary to protect a particular use, acute and chronic levels will be measured differently as described in the current Integrated Monitoring Plan.

2.3 Numeric Levels After Active Remediation (Intermediate and Long-Term Site Conditions)

When the Intermediate Site Condition is achieved following completion of active remediation, the surface water must be of sufficient quality to support any surface water use classification in both Segments 4a/4b and 5. All final remedies must be designed to protect surface water for any use as measured at the nearest and/or most directly impacted surface water in Segments 4a/4b and 5. Interim remedies will be consistent with this as a goal. Any temporary modifications will be removed. POCs will be at the outfalls of the terminal ponds and near where Indiana Street crosses both Walnut and Woman Creeks. If the terminal ponds are removed, new monitoring and compliance points will be designated and will consider ground water in stream alluvium.

2.4 Action Determinations

- A. When contaminant concentrations exceed the Table 1 standards at a POC, source evaluation and mitigating action will be required. Specific remedial actions will be determined on a case-by-case basis, but must be designed such that surface water will meet applicable standards at the POCs. If standards are exceeded at a POC, DOE will inform the CDPHE and EPA of such exceedances within 15 days of gaining knowledge of the exceedances. In addition, DOE will, within 30 days of gaining knowledge of the exceedances, submit to CDPHE and EPA a plan and schedule for source evaluation for the exceedance, including a preliminary plan and schedule for mitigating action. Final plans and schedules for mitigating actions will be developed and implemented by DOE, in consultation with CDPHE

and EPA, following completion of the source evaluation. Nothing in this paragraph, however, shall preclude DOE from undertaking timely mitigation once a source has been identified. Once an initial notification, source evaluation, and mitigating action have been triggered for a particular exceedance, additional exceedances from the same source would not require separate notifications or additional source evaluations or mitigation. The Standley Lake Protection Project (SLPP) Operations Agreement addresses conditions and timing of storage and releases of waters in the Woman Creek Reservoir. Consistent with the SLPP Operations Agreement, it is the intent of the Parties that waters which meet the standards at the Indiana Street POC are acceptable for any use.

- B. During active remediation, when contaminant concentrations in Segment 5 exceed the Table 1 action levels, source evaluation will be required. If mitigating action is appropriate, the specific actions will be determined on a case-by-case basis, but must be designed such that surface water will meet applicable standards at the POCs. In the case of action level exceedances in Segment 5, DOE will inform the CDPHE and EPA of such exceedances within 15 days of gaining knowledge of the exceedances. In addition, DOE will, within 30 days of gaining knowledge of the exceedances, submit to CDPHE and EPA a plan and schedule for source evaluation for the exceedance, including a preliminary plan and schedule for mitigating action. Final plans and schedules for mitigating actions will be developed and implemented by DOE, in consultation with CDPHE and EPA, following completion of the source evaluation. Nothing in this paragraph, however, shall preclude DOE from undertaking timely mitigation once a source has been identified. Once an initial notification, source evaluation, and mitigating action (if appropriate) have been triggered for a particular exceedance, additional exceedances from the same source would not require separate notifications or additional source evaluations or mitigation.
- C. Exceedances of water quality standards at a POC may be subject to civil penalties under sections 109 and 310(c) of CERCLA. In addition, failure of DOE to notify CDPHE and EPA of such exceedances, or to undertake source evaluations or mitigating actions as described in paragraph 2.4.A, above, shall be enforceable consistent with the terms of Part 16 of the RFCA.
- D. Exceedances of action levels in Segment 5 shall not be subject to civil penalties. However, failure of DOE to notify CDPHE and EPA of such exceedances, or to undertake source evaluations or mitigating actions (if appropriate) as described in paragraph 2.4.B above, shall be enforceable consistent with the terms of Part 16 of

the RFCA.

2.5 Surface Water Monitoring Network

- A. Surface water monitoring will continue as currently established unless subsequent changes are agreed to by all parties. Surface water monitoring will be consistent with the Integrated Monitoring Plan which will be reviewed and revised on an annual basis.
- B. All parties will receive quarterly surface water monitoring reports which will highlight any exceedances of surface water standards or action levels and any significant changes to surface water flow conditions.

3.0 GROUND WATER

3.1 Basis of Action Levels

At the time RFCA was signed, three ground water classifications applied at RFETS: Domestic Use Quality, Agricultural Use Quality, and Surface Water Protection. Effective March 2, 1997, the WQCC removed the domestic use and agricultural use classifications since direct use of ground water will be prevented at the Site through institutional controls. Surface water protection was retained as the only use classification for ground water at RFETS. During the period of active remediation, ground water action levels will apply and must be protective of surface water standards and quality as well as of ecological resources. Since no other human exposure to on-site ground water is foreseen, ground water action levels are based on surface water and ecological protection. This framework for ground water action levels assumes that all contaminated ground water emerges to surface water before leaving the RFETS.

3.2 Action Level Strategy

The strategy for ground water is intended to prevent contamination of surface water by applying MCLs as ground water action levels. MCLs have been established by EPA for many chemical contaminants and represent the maximum permissible level of a contaminant in drinking water. MCLs are listed at 40 CFR 141.61 and 141.62. Where an MCL for a particular contaminant is lacking, the residential ground water ingestion-based PPRG value will apply. Ground water action levels are based on a two-tier approach, Tier I action levels consist of near-source action levels for accelerated cleanups, and Tier II are action levels which are protective of surface water.

A. Tier I

1. Action levels consist of 100 x MCLs (see Table 2).
2. Designed to identify high concentration ground water "sources" that should be addressed through accelerated actions.

B. Tier II

1. Action levels consist of MCLs (see Table 2).

2. Designed to prevent surface water from exceeding surface water standards/action levels by triggering ground water management actions when necessary.
3. Situations where ground water is contaminating or could contaminate surface water at levels above surface water standards/action levels will trigger a Tier II action.
4. Tier II Action Levels are to be measured in designated wells.
 - a. Tier II wells have been selected by all parties from the existing monitoring network where practical. New wells have been proposed where apparent gaps exist. Designated Tier II wells are listed in Table 3.
 - b. Tier II wells are either currently uncontaminated or contaminated at levels less than MCLs. In general, Tier II wells are located between the downgradient edge of each plume and the surface water towards which the plume is most directly migrating.
 - c. If the proposed new wells are shown to be contaminated or if additional plume information dictates, new or alternate wells will need to be chosen.

3.3 Action Determinations

A. Tier I

1. If Tier I action levels are exceeded, an evaluation is required to determine if remedial or management action is necessary to prevent surface water from exceeding standards. If this evaluation determines that action is necessary, the type and location of the action will be delineated and implemented as an accelerated action. This evaluation may include a trend analysis based on existing data. Accelerated action priority will be given to plumes showing no significant decreasing trend in ground water contaminant concentrations over 2 years.

2. Additional ground water that does not exceed the Tier I action levels may still need to be remediated or managed through accelerated actions or CAD/RODs to protect surface water quality or ecological resources and/or prevent action level exceedances at Tier II wells (e.g., lower-level, but fast-moving contamination). The plume areas to be remediated and the cleanup levels or management techniques utilized will be determined on a case-by-case basis.

B. Tier II

1. If concentrations in a Tier II well exceed MCLs during a regular sampling event, as specified in the Integrated Monitoring Plan, monthly sampling in that well will be required. Three consecutive monthly samples showing contaminant concentrations greater than MCLs will trigger an evaluation. This will require a ground water remedial action, if modeling, which considers mass balancing and flux calculations and multiple source contributions, predicts that surface water action levels will be exceeded in surface water. These actions will be determined on a case-by-case basis and will be designed to treat, contain, manage, or mitigate the contaminant plume. Such actions will be incorporated into the ER Ranking (RFCA Attachment 4) in which they will be given weight according to measured or predicted impacts to surface water.
2. Ground water contaminated at levels above ground water action levels currently exists at several locations. Each of these situations will be addressed according to appropriate decision documents.
3. Any contamination in ground water resulting from releases from a unit at RFETS subject to RCRA interim status requirements will be addressed through this ALF and through remedial actions rather than through RCRA closure (see Attachment 10 to RFCA, RCRA Closure for Interim Status Units). This would include ground water containing nitrates from the Solar Ponds plume. Addressing the nitrates through this framework will allow these waters to be managed in a more cost-effective and flexible manner.

C. Other Considerations

1. Efficient, cost-effective, and feasible actions that are taken to remediate or

manage contaminated ground water may not necessarily be taken at the leading edge of plumes, but rather at a location within the plume. Factors contributing to this situation could include technical impracticability at the plume edge, topographic or ecologic problems at the plume edge, etc. This situation may result in a portion of a plume that will not be remediated or managed. This plume portion may cause exceedance of MCLs at Tier II wells or exceedance of surface water standards/action levels. When an up-gradient ground water action is taken that results in this situation, DOE and its subcontractor may request relief from the ground water and/or surface water standards. CDPHE and EPA will evaluate the request and may grant temporary relief or a change to the standards/action levels for a specific area. Soil or subsurface soil source removals will not be considered as the sole justification for the changed standard/action levels. In addition, such changes will be determined such that surface water use classifications are not jeopardized and surface water quality does not exceed standards at POCs.

2. Ground water plumes that can be shown to be stationary and do not therefore present a risk to surface water, regardless of their contaminant levels, will not require remediation or management. They will require continued monitoring to demonstrate that they remain stationary.
3. Where background levels exceed action levels, more frequent sampling and remedial actions will not be triggered. For those constituents where high background levels exist, a modified action level considering background will be developed.
4. When groundwater action levels for volatile organic compounds (VOCs) are exceeded in the vicinity of buildings designated for reuse, human-health risks due to inhalation of indoor accumulations of those VOCs must be considered. When such an exceedance occurs in the Industrial Use Area, the evaluation which is triggered must include a comparison against the appropriate PPRGs which have been calculated for office worker exposure to indoor air.

3.4 Ground Water Monitoring Network

- A. Ground water monitoring will be consistent with the Integrated Monitoring Plan

which will be reviewed on an annual basis.

- B. All ground water monitoring data as well as changes in hydrologic conditions and exceedances of ground water action levels will be reported quarterly and summarized annually to all parties.
- C. If quarterly reporting shows that previously uncontaminated wells are contaminated above ground water action levels, the sampling frequency will be increased to monthly. Three consecutive monthly samples showing exceedances will trigger an evaluation to determine if a remedial or management action is necessary. If three consecutive monthly samples then show no exceedances, the sampling frequency will revert back to the frequency specified in the Integrated Monitoring Plan.
- D. All ground water plumes that exceed ground water action levels must continue to be monitored until the need for institutional controls is mitigated.
- E. All ground water remedies, as well as some soil remedies, will require ground water performance monitoring. The amount, frequency, and location of any performance monitoring will be based on the type of remedy implemented and will be determined on a case-by-case basis within decision documents. The remedy should also consider that surface water quality will be acceptable for all uses after active remediation.

4.0 SUBSURFACE SOIL

4.1 Basis for Action Levels

Subsurface soil is defined as soil deeper than six inches below the ground surface. Action levels for subsurface soil are intended to be protective of:

- human exposure appropriate for the land uses delineated on Figure 1;
- surface water standards via ground water transport; and
- ecological resources.

4.2 Action Levels

The subsurface soil action levels have been calculated using a two-tier approach.

A. Tier I

1. All subsurface soils capable of leaching organic compounds to ground water at concentrations greater than or equal to 100 x MCLs. Where an MCL for a particular contaminant is lacking, the residential ground water ingestion-based PPRG value will apply. Contaminant-specific Tier I action levels for organics, have been determined using a soil/water partitioning equation and a dilution factor from EPA's Soil Screening Guidance (1996). These derived values and the parameters used to derive them are listed in Table 4 of this document. The subsurface media characteristics for these calculations are based on Site-specific data or conservative values where representative RFETS values cannot be determined. Where subsurface characteristics in a particular area within RFETS differ significantly from those chosen as representative of the entire Site, those alternate values should be used. When refined parameters are agreed to by the Parties, alternative, site-specific action levels may be calculated.
2. Tier I action levels for inorganic contaminants in subsurface soil are the same as Tier I action levels for the corresponding contaminants in surface

soil. These action levels are, therefore, human-health risk-based for the appropriate land-use receptor (office worker or open space recreational user). If an accurate subsurface soil leaching model can be developed for RFETS in the future and is agreed upon by the RFCA Parties, this application may need to be updated.

3. Tier I action levels derived for radionuclides in surface soil are also applied as Tier I action levels for radionuclides in subsurface soil. They are the more conservative of:
 - a. An annual radiation dose limit of 15 mrem for the appropriate land use receptor, or
 - b. An annual radiation dose limit of 85 mrem for a hypothetical future resident assuming failure of passive control measures.

The total dose from multiple radionuclides will be accounted for by applying the sum-of-ratios method.

B. Tier II

1. All subsurface soils capable of leaching organic compounds to ground water at concentrations greater than or equal to MCLs. Where an MCL for a particular contaminant is lacking, the residential ground water ingestion-based PPRG value will apply. Contaminant-specific Tier I action levels for organics, have been determined using a soil/water partitioning equation and a dilution factor from EPA's Soil Screening Guidance (1996). These derived values and the parameters used to derive them are listed in Table 4 of this document. The subsurface media characteristics for these calculations are based on Site-specific data or conservative values where representative RFETS values cannot be determined. Where subsurface characteristics in a particular area within RFETS differ significantly from those chosen as representative of the entire Site, those alternate values should be used. When refined parameters are agreed to by the Parties, alternative, site-specific action levels may be calculated.
2. Tier II action levels for inorganic contaminants in subsurface soil are the same as Tier II action levels for the corresponding contaminants in surface

soil. These action levels are, therefore, based on risk to the appropriate land-use receptor (office worker or open space recreational user). If an accurate subsurface soil leaching model can be developed for RFETS in the future and is agreed upon by the RFCA Parties, this application may need to be updated.

3. Tier II action levels derived for radionuclides in surface soil are also applied as Tier II action levels for radionuclides in subsurface soil. Action levels for radionuclides are based on an annual dose of 15 mrem to a hypothetical future resident. The total dose from multiple radionuclides will be accounted for by applying the sum-of-ratios method.
4. Additional subsurface soil may need to be remediated or managed to protect surface water quality via ground water transport or ecological resources. Subsurface soil presenting unacceptable ecological risks (hazard index [HI] ≥ 1) identified using the Ecological Risk Assessment Methodology will be evaluated for remediation or management.

4.3 Action Determinations

A. Tier I

When contaminant levels in subsurface soil exceed Tier I action levels, subsurface soil source removals will be triggered. These removals will be accomplished through accelerated actions.

B. Tier II

When Tier II action levels are exceeded, an evaluation will be made to determine if an action is necessary to protect surface water or ecological resources. If an action is shown to be necessary, a process to identify, evaluate, and implement efficient, cost-effective, and feasible remediation or management actions will be triggered.

- C. Appropriate remedial or management actions will be determined on a case-by-case basis, and may include the removal, treatment, disposal, or in-place stabilization of contaminated subsurface soils. Actions will consider the following:

- Actions will be developed in an integrated manner with other actions being taken;
 - Actions will be consistent with best management practices;
 - Actions may be accomplished by means of an interim or final action; and
 - Remediation and/or management actions will be implemented to protect ecological resources where those actions can be implemented without damaging other ecological resources.
- D. Single geographically isolated data points of subsurface soil contamination above the Tier I or Tier II action levels will be evaluated for potential source magnitude. These single points will not necessarily trigger a source removal, remedial, or management action, depending on the source evaluation.
- E. When subsurface soil action levels for volatile organic compounds (VOCs) are exceeded in the vicinity of buildings designated for reuse, human-health risks due to inhalation of indoor accumulations of those VOCs must be considered. When such an exceedance occurs in the Industrial Use -Area, the evaluation which is triggered must include a comparison against the appropriate PPRGs which have been calculated for office worker exposure to indoor air.

5.0 SURFACE SOIL

5.1 Basis for Action Levels

Surface soil is defined as the upper six inches of soil. Action levels for surface soil are intended to be protective of:

- human exposure appropriate for the land uses delineated on Figure 1;
- surface water quality via runoff; and
- ecological resources.

5.2 Action Levels

The surface soil action levels have been calculated using a two-tier approach based on protection of appropriate human exposure.

A. Tier I

1. Action levels for non-radionuclides are human-health risk-based (carcinogenic risk equal to 10^{-4} and/or an HI of 1) for the appropriate land-use receptor. Table 5 presents the calculated action levels for these exposure scenarios:
 - a. Industrial Use Area (Area 1 on Figure 1): Action levels are based on Office Worker exposure as defined in the final PPRG document.
 - b. Restricted Open Space Area (Area 2 and 4 on Figure 1): Action levels are based on Open Space Recreational User exposure as defined in the final PPRG document.
2. Action levels for radionuclides will be the more conservative of:
 - a. An annual radiation dose of 15 mrem for the appropriate land use receptor, or
 - b. An annual radiation dose of 85 mrem for a hypothetical future

resident assuming failure of passive control measure.

The total dose from multiple radionuclides will be accounted for by applying the sum-of-ratios method.

B. Tier II

1. Action levels for non-radionuclides are human-health risk-based (carcinogenic risk of 10^{-6} and/or an HI of 1) for the appropriate land-use receptor. Table 5 presents the calculated action levels for these exposure scenarios:
 - a. Industrial Use Area (Area 1 on Figure 1): Action levels are based on Office Worker exposure as defined in the final PPRG document.
 - b. Restricted Open Space Area (Area 2 and 4 on Figure 1): Action levels are based on Open Space Recreational User exposure as defined in the final PPRG document.
2. Action levels for radionuclides are based on an annual radiation dose of 15 mrem to a hypothetical future resident. The total dose from multiple radionuclides will be accounted for by applying the sum-of-ratios method.
3. Additional surface soil may need to be remediated or managed to protect surface water quality via runoff or ecological resources. The amount of soil and the protective remediation levels and/or management technique will be determined on a case-by-case basis. Surface soil presenting unacceptable ecological risks (a HI greater than or equal to 1) identified using the Ecological Risk Assessment Methodology will be evaluated for remediation or management.

5.3 Action Determinations

A. Tier I

When contaminant levels in surface soil exceed Tier I action levels, a process to identify, evaluate and implement efficient, cost-effective, and feasible remediation

or management actions will be triggered. Appropriate remedial or management actions will be determined through this process on a case-by-case basis, and may include the removal, treatment, disposal, or in-place stabilization of contaminated surface soils.

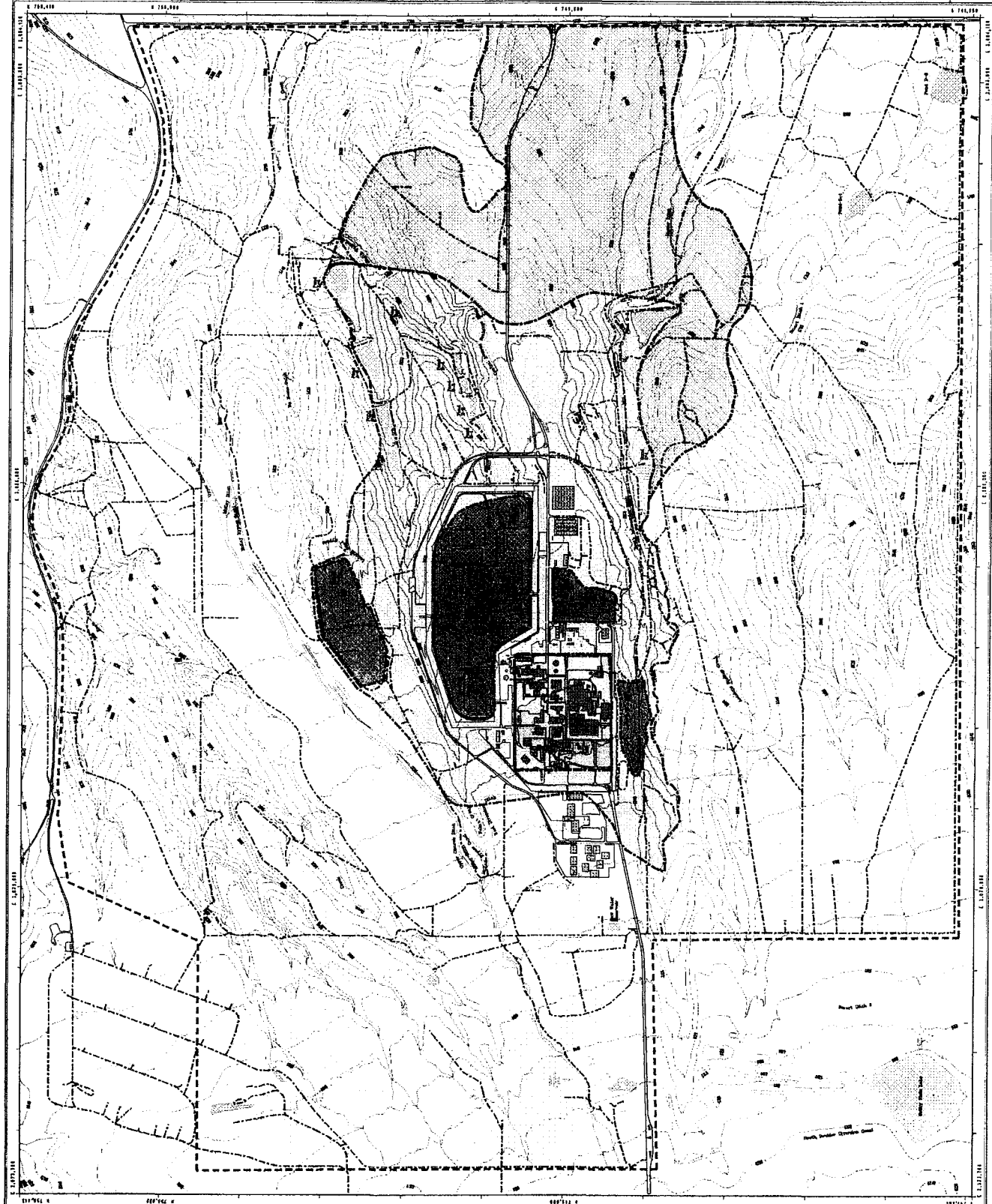
B. Tier II

When contaminant levels in surface soil exceed Tier II action levels, they will be managed. Management may include, but is not limited to, "hotspot" removal, capping, or designating land uses that preclude unacceptable exposure.

C. Actions will consider the following:

- Actions will be developed in an integrated manner with other actions being taken;
- Actions will be consistent with best management practices;
- Actions may be accomplished by means of an interim or final action; and
- Remediation and/or management actions will be implemented to protect ecological resources where those actions can be implemented without damaging other ecological resources.

Figure 1
Conceptual RFETS Land Uses



U.S. Department of Energy
Rocky Flats Environmental Technology Site
MAP ID: 4512850
February 22, 1998

SUMMARY TABLE: ACTION LEVELS AND STANDARDS FRAMEWORK

SURFACE WATER - During Active Remediation (Near-Term Site Condition)

Surface Water:	Action Levels (with temporary modifications, as appropriate)		Action	Point of Evaluation	Standards (with temporary modifications, as appropriate)		Action	Points of Compliance
Segment 4					Non-Radionuclides: Most stringent among the Basic or Site-Specific Standards (nitrate = 100 ppm)	Radionuclides: Basic Standards and Site-Specific Standards (Pu and Am = 0.15 pCi/L)	Notification, source evaluation, mitigation if appropriate	Terminal Pond Outfalls and on Walnut and Woman Creeks at Indiana Street
Segment 5	Non-Radionuclides: Most stringent among the Basic or Site-Specific Standards (nitrate = 100 ppm)	Radionuclides: Basic Standards and Site-Specific Standards (Pu and Am = 0.15 pCi/L)	Notification, source evaluation, mitigation if appropriate	Within ponds and in main stream channels, at existing monitoring stations				

SURFACE WATER - After Active Remediation (Intermediate and Long-Term Site Condition)

Surface Water:	Action Levels ⁽¹⁾		Action	Point of Evaluation	Standards ⁽²⁾		Action	Points of Compliance
Segment 4					Non-Radionuclides: Most stringent among the Basic or Site-Specific Standards (nitrate = 100 ppm)	Radionuclides: Basic Standards and Site-Specific Standards (Pu and Am = 0.15 pCi/L)	Notification, source evaluation, mitigation if appropriate	Terminal Pond Outfalls and on Walnut and Woman Creeks at Indiana St.; TBD if ponds gone
Segment 5					Non-Radionuclides: Most stringent among the Basic or Site-Specific Standards (nitrate = 100 ppm)	Radionuclides: Basic Standards and Site-Specific Standards (Pu and Am = 0.15 pCi/L)	Notification, source evaluation, mitigation if appropriate	Terminal Pond Outfalls and on Walnut and Woman Creeks at Indiana St.; TBD if ponds gone

(1) After active remediation, the concept of action levels in surface water will no longer be necessary. All action levels will either be discontinued or converted to enforceable standards.

(2) Standards for Segment 4 and Segment 5 become identical when the period of active remediation is concluded.

SUMMARY TABLE: ACTION LEVELS AND STANDARDS FRAMEWORK (continued)

OTHER MEDIA - During Active Remediation (Near-Term Site Condition)

Other Media:	Tier I				Tier II		
	Action Level	Action	Cleanup Level	Point of Measurement	Action Level	Action	Cleanup Level
Ground Water	100 x MCLs ⁽¹⁾ and protection of surface water and ecological resources	Plume evaluation, plume management if necessary	Protective of surface water and ecological resources	None; applies across RFETS	MCL ⁽¹⁾ + protection of surface water	Monthly sampling; plume evaluation, plume management if necessary	Protective of surface water and ecological resources
Subsurface Soil	Organics - protective of 100 x MCLs ⁽¹⁾ in ground water; Inorganics/radionuclides - equal to surface soil levels	Accelerated source removal	Protective of 100 x MCLs ⁽¹⁾ in ground water	None; applies across RFETS	Inorganics/radionuclides - equal to surface soil levels; Protective of surface water and ecological resources	Source evaluation; remediation or management if appropriate	Protective of surface water and ecological resources
Surface Soil	10 ⁻⁴ carcinogenic risk or HI=1 for appropriate land use receptor OR 15/85 mrem/yr dose to appropriate land use receptor	Remediation or management action (accelerated)	Protective of human health for appropriate land use scenario	None; applies across RFETS	10 ⁻⁴ carcinogenic risk and HI=1; protective of surface water and ecological resources OR 15 mrem/yr dose (residential)	Management including engineered or institutional controls	Protective of human health, surface water, and ecological resources
							Human health: none (applies across RFETS) Surface water: actual or predicted exceedances of surface water action levels or standards.

(1) For chemicals without an Maximum Contaminant Level (MCL), residential ground water ingestion "Programmatic Preliminary Remediation Goals" (PPRGs) will be used since they are the closest in derivation to MCLs.

OTHER MEDIA - After Active Remediation (Intermediate and Long-Term Site Condition)

The Action Level and Standards Framework will continue in effect until the need for land and water use control is mitigated. When the Intermediate Site Condition is achieved, on-going monitoring and maintenance of RFETS will continue. Should monitoring identify some off-normal contaminant migration event, decisions about any necessary remediation will be made consistent with the Action Levels and Standards Framework.

Table 1 - Surface Water Action Levels & Standards

Analyte	CAS Reference Number	Standards and Action Levels [a] (mg/L)	Basis [b]	Temporary Modifications [c] (mg/L)	PQLs [d] (mg/L)
Acenaphthene	83-32-9	5.20E-01	AL		1.00E-02
Acenaphthylene	208-96-8	2.80E-06	W+F		1.00E-02
Acetone	67-64-1	3.65E+00	PPRG		
Acrolein	107-02-8	2.10E-02	AL		1.00E-02
Acrylonitrile	107-13-1	5.80E-05	W+F		5.00E-03
Alachlor	15972-60-8	2.00E-03	WS		2.00E-03
Aldicarb	116-06-3	3.00E-03	WS		1.00E-02
Aldicarb sulfone	1646-88-4	1.00E-03	WS		3.00E-03
Aldicarb sulfoxide	1646-87-3	4.00E-03	WS		3.00E-03
Aldrin	309-00-2	1.30E-07	W+F		1.00E-02
Aluminum, dissolved	7429-90-5	8.70E-02	AL		
Ammonia, un-ionized	7664-41-7	[e]	[e]		
Anthracene	120-12-7	9.60E+00	W+F		1.00E-02
Antimony, total recoverable	7440-36-0	6.00E-03	W+F, WS		1.00E-02
Aroclor-1016	12674-11-2	4.40E-08	W+F [f]		1.00E-03
Aroclor-1221	11104-28-2	4.40E-08	W+F [f]		1.00E-03
Aroclor-1232	11141-16-5	4.40E-08	W+F [f]		1.00E-03
Aroclor-1242	53469-21-9	4.40E-08	W+F [f]		1.00E-03
Aroclor-1248	12672-29-6	4.40E-08	W+F [f]		1.00E-03
Aroclor-1254	11097-69-1	4.40E-08	W+F [f]		1.00E-03
Aroclor-1260	11096-82-5	4.40E-08	W+F [f]		1.00E-03
Arsenic, total recoverable	7440-38-2	5.00E-02	SS, WS		
Atrazine	1912-24-9	3.00E-03	WS		1.00E-03
Barium, total recoverable	7440-39-3	1.00E+00	WS		
Benzene	71-43-2	1.00E-03	W+F, WS	5.00E-03	1.00E-03
Benzidine	92-87-5	1.20E-07	W+F		1.00E-02
alpha-BHC	319-84-6	3.90E-06	W+F		5.00E-05
beta-BHC	319-85-7	1.40E-05	W+F		5.00E-05
gamma-BHC [Lindane]	58-89-9	1.90E-05	W+F		5.00E-05
Benzo(a)anthracene	56-55-3	4.40E-06	W+F		1.00E-02
Benzo(a)pyrene	50-32-8	4.40E-06	W+F, WS		2.00E-04
Benzo(b)fluoranthene	205-99-2	4.40E-06	W+F		1.00E-02
Benzo(g,h,i)perylene	191-24-2	4.40E-06	W+F		1.00E-02
Benzo(k)fluoranthene	207-08-9	4.40E-06	W+F		1.00E-02
Beryllium	7440-41-7	4.00E-03	SS, WS		5.00E-03
Boron, total	7440-42-8	7.50E-01	SS		
Bromodichloromethane	75-27-4	1.00E-01	W+F, WS [g]		1.00E-03
Bromoform [Tribromomethane]	75-25-2	1.00E-01	W+F, WS [g]		1.00E-03
Bromomethane [Methyl Bromide]	74-83-9	4.80E-02	W+F		1.00E-03
2-Butanone [Methylethyl Ketone]	78-93-3	2.19E+01	PPRG		
Butylbenzylphthalate	85-68-7	3.00E+00	W+F		1.00E-02
Cadmium, dissolved	7440-43-9	1.50E-03	TVS [h]		5.00E-03
Carbofuran	1563-66-2	3.60E-02	WS		7.00E-03
Carbon disulfide	75-15-0	3.65E+00	PPRG		
Carbon tetrachloride	56-23-5	2.50E-04	W+F	5.00E-03	1.00E-03
Chlordane	5103-71-9	5.80E-07	W+F		1.00E-03
Chlorobenzene	108-90-7	1.00E-01	W+F, WS		5.00E-03
Chloroethane	75-00-3	2.94E-02	PPRG		
bis(2-Chloroethyl)ether	111-44-4	3.00E-05	W+F, WS		1.00E-02
Chloroform [Trichloromethane]	67-66-3	1.00E-01	W+F, WS [g]		1.00E-03
bis(2-Chloroisopropyl)ether	39638-32-9	1.40E+00	W+F		1.00E-02
Chloromethane [Methyl Chloride]	74-87-3	5.70E-03	W+F		1.00E-03

Table1 - Surface Water Action Levels & Standards

Analyte	CAS Reference Number	Standards and Action Levels [a] (mg/L)	Basis [b]	Temporary Modifications [c] (mg/L)	PQLs [d] (mg/L)
4-Chloro-3-methylphenol	59-50-7	3.00E-02	AL		5.00E-02
2-Chloronaphthalene	91-58-7	6.20E-01	AL		
2-Chlorophenol	95-57-8	1.20E-01	W+F		5.00E-02
Chloropyrifos	2921-88-2	4.10E-05	AL		1.00E-04
Chromium III, Total Recoverable	16065-83-1	5.00E-02	SS, WS		
Chromium VI, dissolved	18540-29-9	1.10E-02	TVS [h]		
Chrysene	218-01-9	4.40E-06	W+F		1.00E-02
Copper, dissolved	7440-50-8	1.60E-02	TVS [h]		
Cyanide	57-12-5	5.00E-03	SS		
4,4-DDD	72-54-8	8.30E-07	W+F		1.00E-04
4,4-DDE	72-55-9	5.90E-07	W+F		1.00E-04
4,4-DDT	50-29-3	5.90E-07	W+F		1.00E-04
Dalapon	75-99-0	2.00E-01	WS		1.30E-02
Demeton	8065-48-3	1.00E-04	AL		1.00E-03
Dibenzo(a,h)anthracene	53-70-3	4.40E-06	W+F		1.00E-02
Dibromochloromethane	124-48-1	1.00E-01	W+F, WS [g]		1.00E-03
1,2-Dibromo-3-chloropropane	96-12-8	2.00E-04	WS		1.00E-03
Di-n-butylphthalate	84-74-2	3.65E+00	PPRG		1.00E-02
1,2-Dichlorobenzene	95-50-1	6.20E-01	W+F, WS		1.00E-02
1,3-Dichlorobenzene	541-73-1	4.00E-01	W+F		1.00E-02
1,4-Dichlorobenzene	106-46-7	7.50E-02	W+F, WS		1.00E-02
3,3-Dichlorobenzidine	91-94-1	3.90E-05	W+F		1.00E-02
1,1-Dichloroethane	75-34-3	3.65E+00	PPRG		1.00E-03
1,2-Dichloroethane	107-06-2	4.00E-04	W+F	5.00E-03	1.00E-03
1,1-Dichloroethene	75-35-4	5.70E-05	W+F	7.00E-03	1.00E-03
1,2-Dichloroethene (cis)	156-59-2	7.00E-02	WS		5.00E-03
1,2-Dichloroethene (trans)	156-60-5	1.00E-01	W+F, WS		5.00E-03
2,4-Dichlorophenol	120-83-2	2.10E-02	W+F, WS		5.00E-02
Dichlorophenoxyacetic acid [2,4-D]	94-75-7	7.00E-02	WS		1.00E-03
1,2-Dichloropropane	78-87-5	5.60E-04	W+F, WS		1.00E-03
1,3-Dichloropropylene	542-75-6	1.00E-02	W+F		1.00E-03
Dieldrin	60-57-1	1.40E-07	W+F		1.00E-04
Di(2-ethylhexyl)adipate	103-23-1	4.00E-01	WS		6.00E-03
Diethylphthalate	84-66-2	2.30E+01	W+F		1.00E-02
Diisopropyl methyl phosphonate	1445-75-6	8.00E-03	WS		1.00E-03
2,4-Dimethylphenol	105-67-9	5.40E-01	W+F		5.00E-02
Dimethylphthalate	131-11-3	3.13E+02	W+F		1.00E-02
4,6-Dinitro-2-methylphenol	534-52-1	1.30E-02	W+F		5.00E-02
2,4-Dinitrophenol	51-28-5	1.40E-02	W+F, WS		5.00E-02
2,4-Dinitrotoluene	121-14-2	1.10E-04	W+F		1.00E-02
2,6-Dinitrotoluene	606-20-2	2.30E-02	AL		1.00E-02
Dinoseb	88-85-7	7.00E-03	WS		2.00E-03
Dioxin (2,3,7,8 TCDD)	1746-01-6	1.30E-11	W+F		
1,2-Diphenylhydrazine	122-66-7	4.70E-05	W+F		
Diquat	65-00-7	2.00E-02	WS		4.00E-03
Endosulfan	115-29-7	5.60E-05	AL		1.00E-04
Endosulfan sulfate	1031-07-8	1.10E-01	W+F		1.00E-04
Endothall	145-73-3	1.00E-01	WS		9.00E-02
Endrin (technical)	72-20-8	2.30E-06	AL		1.00E-04
Endrin aldehyde	7421-93-4	2.00E-04	W+F, WS		1.00E-04
Ethylbenzene	100-41-4	6.80E-01	W+F, WS		1.00E-02
Ethylene dibromide [1,2-Dibromomethane]	106-93-4	5.00E-05	WS		
bis(2-Ethylhexyl)phthalate	117-81-7	1.80E-03	W+F		1.00E-02

Table1 - Surface Water Action Levels & Standards

Analyte	CAS Reference Number	Standards and Action Levels [a] (mg/L)	Basis [b]	Temporary Modifications [c] (mg/L)	PQLs [d] (mg/L)
Fluoranthene	206-44-0	3.00E-01	W+F		1.00E-02
Fluorene	86-73-7	1.30E+00	W+F		1.00E-02
Fluoride	7782-41-4	2.00E+00	WS		
Glyphosate	1071-83-6	7.00E-01	WS		6.00E-02
Guthion	86-50-0	1.00E-05	AL		1.50E-05
Heptachlor	76-44-8	2.10E-07	W+F		5.00E-05
Heptachlor epoxide	1024-57-3	1.00E-07	W+F		5.00E-05
Hexachlorobenzene	118-74-1	7.50E-07	W+F		1.00E-02
Hexachlorobutadiene	87-68-3	4.50E-04	W+F		1.00E-02
Hexachlorocyclohexane, Technical	608-73-1	1.20E-05	W+F		2.00E-04
Hexachlorocyclopentadiene	77-47-4	5.00E-03	AL		1.00E-02
Hexachloroethane	67-72-1	1.90E-03	W+F		1.00E-02
Indeno(1,2,3-cd)pyrene	193-39-5	4.40E-06	W+F		1.00E-02
Iron, total recoverable	7439-89-6	1.00E+00	SS		
Isophorone	78-59-1	3.60E-02	W+F		1.00E-02
Lead, dissolved	7439-92-1	6.50E-03	TVS [h]		1.00E-02
Malathion	121-75-4	1.00E-04	AL		2.00E-04
Manganese	7439-96-5	1.00E+00	SS		
Mercury, total	7439-97-6	1.00E-05	SS		1.00E-05
Methoxychlor	72-43-5	3.00E-05	AL		5.00E-04
Methylene chloride [Dichloromethane]	75-09-2	5.00E-03	W+F, WS		1.00E-03
4-Methyl-2-pentanone [Isopropoacetone]	108-10-1	2.92E+00	PPRG		
2-Methylphenol [o-Cresol]	95-48-7	1.83E+00	PPRG		
Mirex	2385-85-5	1.00E-06	AL		1.00E-06
Naphthalene	91-20-3	6.20E-01	AL		1.00E-02
Nickel, dissolved	7440-02-0	1.23E-01	TVS [h]		
Nitrate	14797-55-8	1.00E+01	AG	100 [i]	
Nitrite	14797-65-0	5.00E-01	AL [j]	4.5 [i]	
Nitrobenzene	98-95-3	3.50E-03	W+F, WS		1.00E-02
Nitrosodibutylamine N		6.40E-06	W+F		1.00E-02
Nitrosodiethylamine N	55-18-5	8.00E-07	W+F		1.00E-02
Nitrosodimethylamine N	62-75-9	6.90E-07	W+F		1.00E-02
n-Nitrosodiphenylamine	86-30-6	5.00E-03	W+F		1.00E-02
n-Nitrosodipropylamine	621-64-7	5.00E-06	W+F		1.00E-02
Nitrosopyrrolidine N		1.60E-05	W+F		1.00E-02
Oxamyl(vydate)	23135-22-0	2.00E-01	WS		2.00E-02
Pentachlorobenzene	608-93-5	3.50E-03	W+F		1.00E-02
Pentachlorophenol	87-86-5	2.80E-04	W+F		5.00E-02
Phenanthrene	85-01-8	2.80E-06	W+F		1.00E-02
Phenol	108-95-2	2.56E+00	AL		5.00E-02
Picloram	1918-02-1	5.00E-01	WS		1.00E-03
Pyrene	129-00-0	9.60E-01	W+F		1.00E-02
Selenium	7782-49-2	5.00E-03	SS		1.00E-02
Silver, dissolved	7440-22-4	6.00E-04	TVS [h]		5.00E-03
Simazine	122-34-9	4.00E-03	WS		7.00E-04
Sulfide	18496-25-8	2.00E-03	SS		
Styrene	100-42-5	1.00E-01	WS		5.00E-03
1,2,4,5-Tetrachlorobenzene	95-94-3	2.00E-03	WS		1.00E-02
1,1,2,2-Tetrachloroethane	79-34-5	1.70E-04	W+F		1.00E-03
Tetrachloroethene	127-18-4	8.00E-04	W+F	5.00E-03	1.00E-03
Thallium	7440-28-0	5.00E-04	W+F, WS		1.20E-02
Toluene	108-88-3	1.00E+00	W+F, WS		5.00E-03
Toxaphene	8001-35-2	2.00E-07	AL		3.00E-03

Table1 - Surface Water Action Levels & Standards

Analyte	CAS Reference Number	Standards and Action Levels [a] (mg/L)	Basis [b]	Temporary Modifications [c] (mg/L)	PQLs [d] (mg/L)
1,2,4-Trichlorobenzene	120-82-1	5.00E-02	AL		1.00E-02
1,1,1-Trichloroethane	71-55-6	2.00E-01	W+F, WS		5.00E-03
1,1,2-Trichloroethane	79-00-5	6.00E-04	W+F		1.00E-03
Trichloroethene	79-01-6	2.70E-03	W+F	5.00E-03	1.00E-03
2,4,6-Trichlorophenol	88-06-2	2.00E-03	W+F, WS		5.00E-02
Trichlorophenoxypropionic acid	93-72-1	5.00E-02	WS		5.00E-03
Vinyl chloride	75-01-4	2.00E-03	W+F, WS		2.00E-03
Xylene (total)	1330-20-7	1.00E+01	WS		5.00E-03
Zinc, dissolved	7440-66-6	1.41E-01	TVS [h]		
PHYSICAL PARAMETERS:					
Dissolved oxygen (minimum)		5.0 mg/L	SS		
pH		6.5-9.0	SS		

NOTES:

[a] The values in this table reflect the classifications and standards approved by the Colorado WQCC effective March 2, 1997.

Values apply as standards in Segments 4a and 4b and as action levels in Segment 5. Values based on PPRGs are applied only as action levels and are not enforceable standards. Standards for chloride, dissolved iron, dissolved manganese, and sulfate are Secondary Drinking Water Standards which are based on aesthetic considerations. They have been removed as site-specific standards since Segments 4a, 4b, and 5 waters will not be used for drinking water supply.

[b] Acronyms: AG = Agriculture; AL = Aquatic Life; BS = Basic Standard; PPRG = Programmatic Preliminary Remediation Goal for residential groundwater ingestion; SS = Site Specific Standard; WS = Water Supply; W+F = Water plus Fish

[c] Temporary modifications affect Segment 5 only and apply until December 31, 2009.

[d] Whenever the practical quantitation level (PQL) for a pollutant is higher (less stringent) than a standard/action level or temporary modification, "less than" the PQL will be used as the compliance threshold. These less stringent PQLs are shaded.

[e] There is no un-ionized ammonia standard for Segment 5 or Segment 4b. A standard of 0.1 mg/L applies to Segment 4a which begins in Walnut Creek downstream of Indiana Street.

[f] The total PCB standard in the Basic Standards applies to the sum of the seven Aroclor analytes.

[g] Per the Basic Standards, the Total Trihalomethane (TTHM) standard applies to the sum of the four TTHM compounds.

[h] Table value standards for metals are based on a toxicity equation which uses a hardness value of 143 mg/L.

[i] The listed nitrite value is the chronic aquatic life standard based on chloride levels in excess of 22 mg/L in Segment 4.

[j] The temporary modifications for nitrate and nitrite apply to the Walnut Creek drainage only.

The scientific notation used in this table indicates the power of ten by which the two-decimal-place number is multiplied (e.g., 2.52E-02 = 2.52 X 10⁻² = .0252).

Table1 - Surface Water Action Levels & Standards

Analyte	CAS Ref. No.	Woman Creek [a] (pCi/L)	Walnut Creek [a] (pCi/L)	Temporary Modifications	Basis
RADIONUCLIDES:					
Americium 241	14596-10-2	0.15	0.15	[b]	BS
Plutonium 239/ 240	10-12-8	0.15	0.15	[b]	BS
Radium 226/228		5 [c]	5 [c]		BS
Strontium 89/90	11-10-9	8	8		BS
Tritium	10028-17-8	500	500		SS
Uranium, total	7440-61-1	11	10		SS
Gross Alpha, total	14127-62-9	7	11		SS
Gross Beta, total	12587-47-2	8	19		SS

[a] The values in this table reflect the classifications and standards approved by the WQCC effective March 2, 1997. Radiologic parameters are distinguished by drainage basin in Table 2 of 5 CCR 1002-38. All values apply as standards in Segments 4a and 4b and as action levels in Segment 5.

[b] The narrative temporary modification for americium and plutonium in Segment 5 of Walnut Creek is that concentration that is consistent with attaining the numerical water quality standards in Segment 4(b) of Big Dry Creek. These temporary modifications are effective June 30, 1999 and expire December 31, 2000.

[c] Per the Basic Standards, this value applies to the sum of the two radium isotopes.

ACRONYMS: BS = Basic Standard; SS = Site-Specific Standard

Table 2 - Ground Water Action Levels

Analyte	CAS Reference Number	Tier I [a] (mg/L)	Tier II (mg/L)	Basis [b]	PQLs [c] (mg/L)
Acenaphthene	83-32-9	2.19E+02	2.19E+00	[2]	1.00E-02
Acetone	67-64-1	3.65E+02	3.65E+00	[2]	
Aldrin	309-00-2	5.01E-04	5.01E-06	[2]	1.00E-04
Aluminum	7429-90-5	3.65E+03	3.65E+01	[2]	
Ammonium (as Ammonia)	7664-41-7	3.54E+03	3.54E+01	[2]	
Anthracene	120-12-7	1.10E+03	1.10E+01	[2]	1.00E-02
Antimony	7440-36-0	6.00E-01	6.00E-03	[1]	1.00E-02
Aroclor-1016	12674-11-2	5.00E-02	5.00E-04	[1]	1.00E-03
Aroclor-1221	11104-28-2	5.00E-02	5.00E-04	[1]	1.00E-03
Aroclor-1232	11141-16-5	5.00E-02	5.00E-04	[1]	1.00E-03
Aroclor-1242	53469-21-9	5.00E-02	5.00E-04	[1]	1.00E-03
Aroclor-1248	12672-29-6	5.00E-02	5.00E-04	[1]	1.00E-03
Aroclor-1254	11097-69-1	5.00E-02	5.00E-04	[1]	1.00E-03
Aroclor-1260	11096-82-5	5.00E-02	5.00E-04	[1]	1.00E-03
Arsenic	7440-38-2	5.00E+00	5.00E-02	[1]	
Barium	7440-39-3	2.00E+02	2.00E+00	[1]	
Benzene	71-43-2	5.00E-01	5.00E-03	[1]	1.00E-03
alpha-BHC	319-84-6	1.35E-03	1.35E-05	[2]	5.00E-05
beta-BHC	319-85-7	4.73E-03	4.73E-05	[2]	5.00E-05
gamma-BHC [Lindane]	58-89-9	2.00E-02	2.00E-04	[1]	5.00E-05
Benzo(a)anthracene	56-55-3	1.17E-02	1.17E-04	[2]	1.00E-02
Benzo(a)pyrene	50-32-8	2.00E-02	2.00E-04	[1]	2.00E-04
Benzo(b)fluoranthene	205-99-2	1.17E-02	1.17E-04	[2]	1.00E-02
Benzo(k)fluoranthene	207-08-9	1.17E-01	1.17E-03	[2]	1.00E-02
Benzoic Acid	65-85-0	1.46E+04	1.46E+02	[2]	
Benzyl Alcohol	100-51-6	1.10E+03	1.10E+01	[2]	
Beryllium	7440-41-7	4.00E-01	4.00E-03	[1]	5.00E-03
Bromodichloromethane	75-27-4	1.00E+01	1.00E-01	[1]	1.00E-03
Bromoform [Tribromomethane]	75-25-2	1.00E+01	1.00E-01	[1]	1.00E-03
Bromomethane [Methyl bromide]	74-83-9	5.11E+00	5.11E-02	[2]	1.00E-03
2-Butanone [Methylethyl ketone]	78-93-3	2.19E+03	2.19E+01	[2]	
Butylbenzylphthalate	85-68-7	7.30E+02	7.30E+00	[2]	1.00E-02
Cadmium	7440-43-9	5.00E-01	5.00E-03	[1]	5.00E-03
Carbon disulfide	75-15-0	3.65E+02	3.65E+00	[2]	
Carbon tetrachloride	56-23-5	5.00E-01	5.00E-03	[1]	1.00E-03
alpha-Chlordane	5103-71-9	2.00E-01	2.00E-03	[1]	1.00E-03
beta-Chlordane	5103-74-2	2.00E-01	2.00E-03	[1]	1.00E-03
gamma-Chlordane	12789-03-6	2.00E-01	2.00E-03	[1]	1.00E-03
4-Chloroaniline	106-47-8	1.46E+01	1.46E-01	[2]	
Chlorobenzene	108-90-7	1.00E+01	1.00E-01	[1]	5.00E-03
Chloroethane	75-00-3	2.94E+00	2.94E-02	[2]	
bis(2-Chloroethyl)ether	111-44-4	7.74E-03	7.74E-05	[2]	1.00E-02
Chloroform [Trichloromethane]	67-66-3	1.00E+01	1.00E-01	[1]	1.00E-03
bis(2-Chloroisopropyl)ether	39638-32-9	1.22E-01	1.22E-03	[2]	1.00E-02
Chloromethane [Methyl chloride]	74-87-3	6.55E-01	6.55E-03	[2]	1.00E-03
2-Chloronaphthalene	91-58-7	2.92E+02	2.92E+00	[2]	
2-Chlorophenol	95-57-8	1.83E+01	1.83E-01	[2]	5.00E-02
Chromium (total)	7440-47-3	1.00E+01	1.00E-01	[1]	
Chrysene	218-01-9	1.17E+00	1.17E-02	[2]	1.00E-02

Table 2 - Ground Water Action Levels

Analyte	CAS Reference Number	Tier I [a] (mg/L)	Tier II (mg/L)	Basis [b]	PQLs [c] (mg/L)
Cobalt	7440-48-4	2.19E+02	2.19E+00	[1]	
Copper	7440-50-8	1.30E+02	1.30E+00	[3]	
Cyanide	57-12-5	2.00E+01	2.00E-01	[1]	
4,4-DDD	72-54-8	3.55E-02	3.55E-04	[2]	1.00E-04
4,4-DDE	72-55-9	2.50E-02	2.50E-04	[2]	1.00E-04
4,4-DDT	50-29-3	2.50E-02	2.50E-04	[2]	1.00E-04
Dalapon	75-99-0	2.00E+01	2.00E-01	[1]	1.30E-02
Dibenzo(a,h)anthracene	53-70-3	1.17E-03	1.17E-05	[2]	1.00E-02
Dibenzofuran	132-64-9	1.46E+01	1.46E-01	[2]	
Dibromochloromethane	124-48-1	1.01E-01	1.01E-03	[2]	1.00E-03
1,2-Dibromo-3-chloropropane	96-12-8	2.00E-02	2.00E-04	[1]	1.00E-03
Di-n-butylphthalate	84-74-2	3.65E+02	3.65E+00	[2]	1.00E-02
1,2-Dichlorobenzene	95-50-1	6.00E+01	6.00E-01	[1]	1.00E-02
1,3-Dichlorobenzene	541-73-1	6.00E+01	6.00E-01	[1]	1.00E-02
1,4-Dichlorobenzene	106-46-7	7.50E+00	7.50E-02	[1]	1.00E-02
3,3-Dichlorobenzidine	91-94-1	1.89E-02	1.89E-04	[2]	1.00E-02
1,1-Dichloroethane	75-34-3	3.65E+02	3.65E+00	[2]	1.00E-03
1,2-Dichloroethane	107-06-2	5.00E-01	5.00E-03	[1]	1.00E-03
1,1-Dichloroethene	75-35-4	7.00E-01	7.00E-03	[1]	1.00E-03
1,2-Dichloroethene (total)	75-35-4	7.00E+00	7.00E-02	[1]	5.00E-03
2,4-Dichlorophenol	120-83-2	1.10E+01	1.10E-01	[2]	5.00E-02
2,4-Dichlorophenoxyacetic acid (2,4-D)	94-75-7	7.00E+00	7.00E-02	[1]	1.00E-03
1,2-Dichloropropane	78-87-5	5.00E-01	5.00E-03	[1]	1.00E-03
cis-1,3-Dichloropropene	10061-01-5	4.73E-02	4.73E-04	[2]	1.00E-03
trans-1,3-Dichloropropene	10061-02-6	4.73E-02	4.73E-04	[2]	1.00E-03
Dieldrin	60-57-1	5.32E-04	5.32E-06	[2]	1.00E-04
Diethylphthalate	84-66-2	2.92E+03	2.92E+01	[2]	1.00E-02
2,4-Dimethylphenol	105-67-9	7.30E+01	7.30E-01	[2]	5.00E-02
Dimethylphthalate	131-11-3	3.65E+04	3.65E+02	[2]	1.00E-02
4,6-Dinitro-2-methylphenol	534-52-1	3.65E-01	3.65E-03	[2]	
2,4-Dinitrophenol	51-28-5	7.30E+00	7.30E-02	[2]	5.00E-02
2,4-Dinitrotoluene	121-14-2	1.25E-02	1.25E-04	[2]	1.00E-02
2,6-Dinitrotoluene	606-20-2	1.25E-02	1.25E-04	[2]	1.00E-02
Di-n-octylphthalate	117-84-0	7.30E+01	7.30E-01	[2]	
Endosulfan I	959-98-8	2.19E+01	2.19E-01	[2]	1.00E-04
Endosulfan II	33213-65-9	2.19E+01	2.19E-01	[2]	1.00E-04
Endosulfan sulfate	1031-07-8	2.19E+01	2.19E-01	[2]	1.00E-04
Endosulfan (technical)	115-29-7	2.19E+01	2.19E-01	[2]	1.00E-04
Endrin (technical)	72-20-8	2.00E-01	2.00E-03	[1]	1.00E-04
Ethylbenzene	100-41-4	7.00E+01	7.00E-01	[1]	1.00E-02
bis(2-Ethylhexyl)phthalate	117-81-7	6.00E-01	6.00E-03	[1]	1.00E-02
Fluoranthene	206-44-0	1.46E+02	1.46E+00	[2]	1.00E-02
Fluorene	86-73-7	1.46E+02	1.46E+00	[2]	1.00E-02
Fluoride	7782-41-4	4.00E+02	4.00E+00	[1]	
Glyphosate	1071-83-6	7.00E+01	7.00E-01	[1]	6.00E-02
Heptachlor	76-44-8	4.00E-02	4.00E-04	[1]	5.00E-05
Heptachlor epoxide	1024-57-3	2.00E-02	2.00E-04	[1]	5.00E-05
Hexachlorobenzene	118-74-1	1.00E-01	1.00E-03	[1]	1.00E-02
Hexachlorobutadiene	87-68-3	1.09E-01	1.09E-03	[2]	1.00E-02

Table 2 - Ground Water Action Levels

Analyte	CAS Reference Number	Tier I [a] (mg/L)	Tier II (mg/L)	Basis [b]	PQLs [c] (mg/L)
Hexachlorocyclopentadiene	77-47-4	5.00E+00	5.00E-02	[1]	1.00E-02
Hexachloroethane	67-72-1	6.08E-01	6.08E-03	[2]	1.00E-02
Indeno(1,2,3-cd)pyrene	193-39-5	1.17E-02	1.17E-04	[2]	1.00E-02
Isophorone	78-59-1	8.96E+00	8.96E-02	[2]	1.00E-02
Lead (dissolved)	7439-96-5	1.50E+00	1.50E-02	[3]	1.00E-02
Lithium	7439-93-2	7.30E+01	7.30E-01	[2]	
Manganese	7439-96-5	1.72E+02	1.72E+00	[2]	
Mercury	7439-97-6	2.00E-01	2.00E-03	[1]	1.00E-03
Methoxychlor	72-43-5	4.00E+00	4.00E-02	[1]	5.00E-04
Methylene chloride [Dichloromethane]	75-09-2	5.00E-01	5.00E-03	[1]	1.00E-03
2-Methylnaphthalene	91-57-6	1.46E+02	1.46E+00	[2]	
4-Methyl-2-pentanone	108-10-1	2.92E+02	2.92E+00	[2]	
2-Methylphenol	95-48-7	1.83E+02	1.83E+00	[2]	
4-Methylphenol	106-44-5	1.83E+01	1.83E-01	[2]	
Molybdenum	7439-98-7	1.83E+01	1.83E-01	[2]	
Naphthalene	91-20-3	1.46E+02	1.46E+00	[2]	1.00E-02
Nickel	7440-02-0	1.40E+01	1.40E-01	[1]	
Nitrate (MCL as N)	14797-55-8	1.00E+03	1.00E+01	[1]	
Nitrite (MCL as N)	14797-65-0	1.00E+02	1.00E+00	[1]	
2-Nitroaniline	88-74-4	2.19E-01	2.19E-03	[2]	
Nitrobenzene	98-95-3	1.83E+00	1.83E-02	[2]	1.00E-02
4-Nitrophenol	100-02-7	2.92E+01	2.92E-01	[2]	
n-Nitrosodiphenylamine	86-30-6	1.74E+00	1.74E-02	[2]	1.00E-02
n-Nitrosodipropylamine	621-64-7	1.22E-03	1.22E-05	[2]	1.00E-02
Pentachlorophenol	87-86-5	1.00E-01	1.00E-03	[1]	5.00E-02
Phenol	108-95-2	2.19E+03	2.19E+01	[2]	5.00E-02
Pyrene	129-00-0	1.10E+02	1.10E+00	[2]	1.00E-02
Selenium	7782-49-2	5.00E+00	5.00E-02	[1]	1.00E-02
Silver	7440-22-4	1.83E+01	1.83E-01	[2]	5.00E-03
Strontium	7440-24-6	2.19E+03	2.19E+01	[2]	
Styrene	100-42-5	1.00E+01	1.00E-01	[1]	5.00E-03
Sulfate	14808-79-8	5.00E+04	5.00E+02	[4]	
1,1,2,2-Tetrachloroethane	79-34-5	4.26E-02	4.26E-04	[2]	1.00E-03
Tetrachloroethene	127-18-4	5.00E-01	5.00E-03	[1]	1.00E-03
Thallium	7440-28-0	2.00E-01	2.00E-03	[1]	1.00E-02
Tin	7440-31-5	2.19E+03	2.19E+01	[2]	
Toluene	108-88-3	1.00E+02	1.00E+00	[1]	5.00E-03
Toxaphene	8001-35-2	3.00E-01	3.00E-03	[1]	3.00E-03
1,2,4-Trichlorobenzene	120-82-1	7.00E+00	7.00E-02	[1]	1.00E-02
1,1,1-Trichloroethane	71-55-6	2.00E+01	2.00E-01	[1]	5.00E-03
1,1,2-Trichloroethane	79-00-5	5.00E-01	5.00E-03	[1]	1.00E-03
Trichloroethene	79-01-6	5.00E-01	5.00E-03	[1]	1.00E-03
2,4,5-Trichlorophenol	95-95-4	5.00E+00	5.00E-02	[1]	
2,4,6-Trichlorophenol	88-06-2	7.74E-01	7.74E-03	[2]	5.00E-02
Vanadium	7440-62-2	2.56E+01	2.56E-01	[2]	
Vinyl acetate	108-05-4	3.65E+03	3.65E+01	[2]	
Vinyl chloride	75-01-4	2.00E-01	2.00E-03	[1]	2.00E-03
Xylene (total)	1330-20-7	1.00E+03	1.00E+01	[1]	5.00E-03
Zinc	7440-66-6	1.10E+03	1.10E+01	[2]	

Table 2 - Ground Water Action Levels

Analyte	CAS Reference Number	Tier I [a] (mg/L)	Tier II (mg/L)	Basis [b]	PQLs [c] (mg/L)
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NOTES:

[a] Tier I action levels are 100 times the corresponding Tier II value.

[b] Basis for Tier II action level:

[1] Maximum Concentration Level (MCL)

[2] Residential groundwater ingestion Programmatic Preliminary Remediation Goal (PPRG)

[3] EPA Action Level based on the Lead and Copper Rule (40 CFR 141.2)

[4] Proposed MCL

[c] If the practical quantitation level (PQL) for a pollutant is higher (less stringent) than an action level, "less than" the PQL will be used as the compliance threshold. These less stringent PQLs are shaded.

The scientific notation used in this table indicates the power of ten by which the two-decimal-place number is multiplied (e.g., 2.52E-02 = 2.52×10^{-2} = .0252).

Table 2 - Ground Water Action Levels

Analyte	CAS Reference Number	Tier I [a] (pCi/L)	Tier II [b] (pCi/L)	PQL (pCi/L)
RADIONUCLIDES:				
Americium-241	14596-10-2	14.5	0.145	
Cesium-137+D	10045-97-3	151	1.51	
Plutonium-239/240	10-12-8	15.1	0.151	
Radium-226/228+D		2000 [c]	20 [c]	
Strontium-89/90	11-10-9	85.2	0.852	
Tritium	10028-17-8	66600	666	
Uranium-233/234	11-08-5	106	1.06	
Uranium-235	15117-96-1	101	1.01	
Uranium-238	7440-61-1	76.8	0.768	

NOTES:

[a] Tier I action levels are 100 times the corresponding Tier II value.

[b] Tier II action levels for radionuclides are the corresponding residential ground water ingestion Preliminary Programmatic Remediation Goals (PPRGs) except for radium isotopes which are proposed MCLs.

[c] This value applies to the sum of the two radium isotopes.

D = Daughters (Indicates that cancer risk estimates for these radionuclides include the contributions from their short-lived decay products, assuming secular equilibrium with the principal nuclide in the environment. Sample analyses for these radionuclides will not include any activity contribution from daughter products.)

Table 3 - Tier II Ground Water Monitoring Wells
for Volatile Organic Compounds

Location Code

6586
75992
6091
10194
1986
P314289
P313589
7086
10992
1786
1386
10692
4087
B206989
23096 (new well)
23196 (new well)
23296 (new well)

Table 4 - Subsurface Soil Action Levels

Analyte	CAS Reference Number	H ^a [a] (unitless)	[Refer- ence]	Kd [b] (L/kg)	[Refer- ence]	Tier I [c] (mg/kg)	Tier II [c] (mg/kg)
ORGANICS:							
Acenaphthene	83-32-9	0.00636	[1]	5.07E+01	[1]	5.34E+04	5.34E+02
Acetone	67-64-1	0.00159	[1]	4.12E-03	[1]	2.72E+04	2.72E+02
Aldrin	309-00-2	0.00697	[1]	1.75E+04	[1]	4.22E+01	4.22E-01
Anthracene	120-12-7	0.00267	[1]	2.11E+02	[1]	>1E+06	1.12E+04
Aroclor-1016	12674-11-2	0.0439	[3,d]	2.21E+03	[1]	5.31E+02	5.31E+00
Aroclor-1221	11104-28-2	0.0439	[3,d]	2.21E+03	[1]	5.31E+02	5.31E+00
Aroclor-1232	11141-16-5	0.0439	[3,d]	2.21E+03	[1]	5.31E+02	5.31E+00
Aroclor-1242	53469-21-9	0.0439	[3]	2.21E+03	[1]	5.31E+02	5.31E+00
Aroclor-1248	12672-29-6	0.0439	[3]	2.21E+03	[1]	5.31E+02	5.31E+00
Aroclor-1254	11097-69-1	0.0439	[3]	2.21E+03	[1]	5.31E+02	5.31E+00
Aroclor-1260	11096-82-5	0.0439	[3]	2.21E+03	[1]	5.31E+02	5.31E+00
Benzene	71-43-2	0.228	[1]	4.22E-01	[1]	1.41E+00	1.41E-02
alpha-BHC	319-84-6	0.000435	[1]	8.81E+00	[1]	5.80E-02	5.80E-04
beta-BHC	319-85-7	0.0000305	[1]	9.02E+00	[1]	2.08E-01	2.08E-03
gamma-BHC [Lindane]	58-89-9	0.000574	[1]	7.66E+00	[1]	7.50E-01	7.50E-03
Benzo(a)anthracene	56-55-3	0.000137	[1]	2.85E+03	[1]	1.60E+02	1.60E+00
Benzo(a)pyrene	50-32-8	0.0000463	[1]	7.30E+03	[1]	7.01E+02	7.01E+00
Benzo(b)fluoranthene	205-99-2	0.00455	[1]	8.81E+03	[1]	4.95E+02	4.95E+00
Benzo(k)fluoranthene	207-08-9	0.000034	[1]	8.81E+03	[1]	4.95E+03	4.95E+01
Benzoic Acid	65-85-0	0.0000631	[1]	4.30E-03	[1]	1.09E+04	1.09E+02
Benzyl Alcohol	100-51-6	—	—	—	—	NV	NV
Bromodichloromethane	75-27-4	0.0656	[1]	3.94E-01	[1]	2.64E+01	2.64E-01
Bromoform [Tribromomethane]	75-25-2	0.0219	[1]	6.23E-01	[1]	3.72E+01	3.72E-01
Bromomethane [Methyl Bromide]	74-83-9	0.256	[1]	7.52E-02	[1]	5.98E+00	5.98E-02
2-Butanone [Methylethyl Ketone]	78-93-3	—	—	—	—	NV	NV
Butylbenzylphthalate	85-68-7	0.0000517	[1]	4.12E+02	[1]	>1E+06	1.44E+04
Carbon disulfide	75-15-0	1.24	[1]	3.27E-01	[1]	9.88E+02	9.88E+00
Carbon tetrachloride	56-23-5	1.25	[1]	1.25E+00	[1]	3.56E+00	3.56E-02
alpha-Chlordane	5103-71-9	0.00199	[1]	8.59E+02	[1]	8.25E+02	8.25E+00
beta-Chlordane	5103-74-2	0.00199	[1]	8.59E+02	[1]	8.25E+02	8.25E+00
gamma-Chlordane	12789-03-9	0.00199	[1]	8.59E+02	[1]	8.25E+02	8.25E+00
4-Chloroaniline	106-47-8	0.0000136	[1]	4.73E-01	[1]	4.37E+01	4.37E-01
Chlorobenzene	108-90-7	0.152	[1]	1.57E+00	[1]	8.30E+01	8.30E-01
Chloroethane	75-00-3	—	—	—	—	NV	NV
bis(2-Chloroethyl)ether	111-44-4	0.000738	[1]	1.11E-01	[1]	9.73E-03	9.73E-05
Chloroform [Trichloromethane]	67-66-3	0.15	[1]	2.85E-01	[1]	2.14E+01	2.14E-01
bis(2-Chloroisopropyl)ether	39638-32-9	—	—	—	—	NV	NV
Chloromethane [Methyl Chloride]	74-87-3	—	—	—	—	NV	NV
2-Chloronaphthalene	91-58-7	—	—	—	—	NV	NV
2-Chlorophenol	95-57-8	0.016	[1]	2.78E+00	[1]	2.57E+02	2.57E+00
Chrysene	208	0.00388	[1]	2.85E+03	[1]	1.60E+04	1.60E+02
4,4-DDD	72-54-8	0.000164	[1]	7.16E+03	[1]	1.22E+03	1.22E+01
4,4-DDE	72-55-9	0.000861	[1]	3.20E+04	[1]	3.84E+03	3.84E+01
4,4-DDT	50-29-3	0.000332	[1]	1.88E+04	[1]	2.26E+03	2.26E+01
Dibenzo(a,h)anthracene	53-70-3	0.000000603	[1]	2.72E+04	[1]	1.53E+02	1.53E+00
Dibromochloromethane	124-48-1	—	—	—	—	NV	NV
Di-n-butylphthalate	84-74-2	3.85E-08	[1]	2.43E+02	[1]	4.26E+05	4.26E+03
1,2-Dichlorobenzene	95-50-1	0.0779	[1]	4.42E+00	[1]	1.32E+03	1.32E+01
1,4-Dichlorobenzene	106-46-7	0.0996	[1]	4.42E+00	[1]	1.65E+02	1.65E+00
3,3-Dichlorobenzidine	91-94-1	0.000000164	[1]	5.18E+00	[1]	4.84E-01	4.84E-03
1,1-Dichloroethane	75-34-3	0.23	[1]	2.26E-01	[1]	6.89E+02	6.89E+00
1,2-Dichloroethane	107-06-2	0.0401	[1]	1.25E-01	[1]	6.68E-01	6.68E-03
1,1-Dichloroethene	75-35-4	1.07	[1]	4.27E-01	[1]	2.19E+00	2.19E-02
1,2-Dichloroethene (total)	75-35-4	0.187	[1,e]	2.54E-01	[1,e]	1.40E+01	1.40E-01
2,4-Dichlorophenol	120-83-2	0.00013	[1]	1.05E+00	[1]	6.35E+01	6.35E-01

Table 4 - Subsurface Soil Action Levels

Analyte	CAS Reference Number	H ¹ [a] (unitless)	[Refer- ence]	Kd [b] (L/kg)	[Refer- ence]	Tier I [c] (mg/kg)	Tier II [c] (mg/kg)
1,2-Dichloropropane	78-87-5	0.115	[1]	3.13E-01	[1]	1.13E+00	1.13E-02
cis-1,3-Dichloropropene	10061-01-5	0.726	[1,f]	3.27E-01	[1,f]	1.20E-01	1.20E-03
trans-1,3-Dichloropropene	10061-02-6	0.726	[1,f]	3.27E-01	[1,f]	1.20E-01	1.20E-03
Dieldrin	60-57-1	0.000619	[1]	1.53E+02	[1]	3.92E-01	3.92E-03
Diethylphthalate	84-66-2	0.0000185	[1]	2.06E+00	[1]	3.10E+04	3.10E+02
2,4-Dimethylphenol	105-67-9	0.000082	[1]	1.50E+00	[1]	5.77E+02	5.77E+00
Dimethylphthalate	131-11-3	—	—	—	—	NV	NV
2,4-Dinitrophenol	51-28-5	0.0000182	[1]	7.16E-05	[1]	5.29E+00	5.29E-02
2,4-Dinitrotoluene	121-14-2	0.0000038	[1]	6.84E-01	[1]	5.01E-02	5.01E-04
2,6-Dinitrotoluene	606-20-2	0.0000306	[1]	4.95E-01	[1]	3.88E-02	3.88E-04
Di-n-octylphthalate	117-84-0	0.00274	[1]	5.96E+05	[1]	>1E+06	>1E+06
Endosulfan I	959-98-8	0.000459	[1,g]	1.53E+01	[1,g]	1.63E+03	1.63E+01
Endosulfan II	33213-65-9	0.000459	[1,g]	1.53E+01	[1,g]	1.63E+03	1.63E+01
Endosulfan (technical)	115-29-7	0.000459	[1,g]	1.53E+01	[1,g]	1.63E+03	1.63E+01
Endrin (technical)	72-20-8	0.000308	[1]	8.81E+01	[1]	8.47E+01	8.47E-01
Ethylbenzene	100-41-4	0.323	[1]	2.60E+00	[1]	9.32E+02	9.32E+00
bis(2-Ethylhexyl)phthalate	117-81-7	0.00000418	[1]	1.08E+05	[1]	3.11E+05	3.11E+03
Fluoranthene	206-44-0	0.00066	[1]	7.66E+02	[1]	5.37E+05	5.37E+03
Fluorene	86-73-7	0.00261	[1]	9.88E+01	[1]	6.94E+04	6.94E+02
Heptachlor	76-44-8	60.7	[1]	1.01E+04	[1]	1.94E+03	1.94E+01
Heptachlor epoxide	1024-57-3	0.00039	[1]	5.96E+02	[1]	5.72E+01	5.72E-01
Hexachlorobenzene	118-74-1	0.0541	[1]	3.94E+02	[1]	1.89E+02	1.89E+00
Hexachlorobutadiene	87-68-3	0.334	[1]	3.84E+02	[1]	2.01E+02	2.01E+00
Hexachlorocyclopentadiene	77-47-4	1.11	[1,h]	1.43E+03	[1,h]	3.44E+04	3.44E+02
Hexachloroethane	67-72-1	0.159	[1]	1.27E+01	[1]	3.77E+01	3.77E-01
Indeno(1,2,3-cd)pyrene	193-39-5	0.0000656	[1]	2.48E+04	[1]	1.40E+03	1.40E+01
Isophorone	78-59-1	0.000272	[1]	3.35E-01	[1]	2.09E+01	2.09E-01
Methoxychlor	72-43-5	0.000648	[1]	7.00E+02	[1]	1.34E+04	1.34E+02
Methylene chloride [Dichloromethane]	75-09-2	0.0898	[1]	8.38E-02	[1]	5.78E-01	5.78E-03
4-Methyl-2-pentanone	108-10-1	—	—	—	—	NV	NV
2-Methylphenol	95-48-7	0.0000492	[1]	6.53E-01	[1]	7.06E+02	7.06E+00
4-Methylphenol	106-44-5	—	—	—	—	NV	NV
Naphthalene	91-20-3	0.0198	[1]	1.43E+01	[1]	1.01E+04	1.01E+02
Nitrobenzene	98-95-3	0.000984	[1]	4.63E-01	[1]	5.39E+00	5.39E-02
n-Nitrosodiphenylamine	86-30-6	0.000205	[1]	9.24E+00	[1]	7.84E+01	7.84E-01
n-Nitrosodipropylamine	621-64-7	0.0000923	[1]	1.72E-01	[1]	1.89E-03	1.89E-05
Pentachlorophenol	87-86-5	0.000001	[1]	4.24E+00	[1]	2.11E+00	2.11E-02
Phenol	108-95-2	0.0000183	[1]	2.06E-01	[1]	3.75E+03	3.75E+01
Pyrene	129-00-0	0.000451	[1]	7.52E+02	[1]	3.97E+05	3.97E+03
Styrene	100-42-5	0.113	[1]	5.56E+00	[1]	2.74E+02	2.74E+00
1,1,2,2-Tetrachloroethane	79-34-5	0.0141	[1]	6.68E-01	[1]	1.68E-01	1.68E-03
Tetrachloroethene	127-18-4	0.754	[1]	1.11E+00	[1]	3.15E+00	3.15E-02
Toluene	108-88-3	0.272	[1]	1.30E+00	[1]	7.07E+02	7.07E+00
Toxaphene	8001-35-2	0.000246	[1]	1.84E+03	[1]	2.65E+03	2.65E+01
1,2,4-Trichlorobenzene	120-82-1	0.0582	[1]	1.27E+01	[1]	4.33E+02	4.33E+00
1,1,1-Trichloroethane	71-55-6	0.705	[1]	7.88E-01	[1]	9.48E+01	9.48E-01
1,1,2-Trichloroethane	79-00-5	0.0374	[1]	3.59E-01	[1]	1.23E+00	1.23E-02
Trichloroethene	79-01-6	0.422	[1]	1.19E+00	[1]	3.28E+00	3.28E-02
2,4,5-Trichlorophenol	95-95-4	0.000178	[1]	1.15E+01	[1]	2.79E+02	2.79E+00
2,4,6-Trichlorophenol	88-06-2	0.000319	[1]	2.73E+00	[1]	1.07E+01	1.07E-01
Vinyl acetate	108-05-4	0.021	[1]	3.76E-02	[1]	3.33E+03	3.33E+01
Vinyl chloride	75-01-4	1.11	[1]	1.33E-01	[1]	3.46E-01	3.46E-03
Xylene (total)	1330-20-7	0.25	[2]	1.86E+00	[2]	9.74E+03	9.74E+01

Table 4 - Subsurface Soil Action Levels

Analyte	CAS Reference Number	H' [a] (unitless)	[Refer-ence]	Kd [b] (L/kg)	[Refer-ence]	Tier I [c] (mg/kg)	Tier II [c] (mg/kg)
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NOTES:

[a] H' (dimensionless Henry's Law Constant (HLC)) = $HLC [atm \cdot m^3/mol] \times 41$

[b] K_d (soil-water partitioning coefficient) = K_{oc} (soil organic carbon/water partition coefficient) \times foc (fraction organic carbon in soil), where foc = .00716 g/g (mean of site data below 6 inches)

[c] Action Level = Soil Screening Level (SSL) times a site-specific Dilution Attenuation Factor (DAF) of 4.8. SSLs for organic compounds have been calculated based on leachability to groundwater at ground water action levels using the formula:

$$SSL = C_w \{K_d + [(\theta_w + \theta_a \times H') / \rho_b]\}$$

where:

C_w = Groundwater Action Level (see Table 2)

θ_w = Water-filled porosity = 0.24 (site-specific value)

θ_a = Air-filled porosity = 0.11 (site-specific value)

ρ_b = Dry bulk density = 1.59 kg/l (site-specific value)

Action levels which have a calculated value greater than 1.00E+06 mg/kg (1,000,000 mg/kg) are shown as ">1E+06".

"NV" means no value was calculated.

[d] Value is not currently available. The value shown represents the Henry's Law Constant for Aradclor 1242, which is assumed to be similar.

[e] Assumes the cis-1,2-dichloroethene value for 1,2-dichloroethene (total).

[f] Assumes the 1,3-dichloropropane value for the 1,3-dichloropropene isomers.

[g] Values for Endosulfan are assumed.

[h] Values for hexachloro-1,3-butadiene are assumed.

The scientific notation used for action level values in this table indicates the power of ten by which the two-decimal-place number is multiplied (e.g., 2.52E-02 = 2.52×10^{-2} = .0252).

References:

[1] EPA, 1996, *Soil Screening Guidance: Technical Background Document*. Office of Emergency and Remedial Response, EPA/540/R-95/128.

[2] EPA, 1994, *Technical Background Document for Soil Screening Guidance, Review Draft*. Office of Solid Waste and Emergency and Remedial Response, EPA/ 540/R-94/106.

[3] EPA, 1990, *Basics of Pump-and-Treat Ground-Water Remediation Technology*. Robert S. Kerr Environmental Research Laboratory, EPA/600/8-90/003.

Table 4 - Subsurface Soil Action Levels

Analyte	CAS Reference Number	Tier I [a]		Tier II [b]	
		Industrial Use (mg/kg)	Open Space Use (mg/kg)	Industrial Use (mg/kg)	Open Space Use (mg/kg)
INORGANICS:					
Aluminum	7429-90-5	>1E+6	>1E+6	>1E+6	>1E+6
Ammonium	7664-41-7	>1E+6	>1E+6	>1E+6	>1E+6
Antimony	7440-36-0	8.18E+02	7.68E+02	8.18E+02	7.68E+02
Arsenic	7440-38-2	3.81E+02	2.99E+02	3.81E+00	2.99E+00
Barium	7440-39-3	1.34E+05	1.33E+05	1.34E+05	1.33E+05
Beryllium	7440-41-7	1.33E+02	1.04E+02	1.33E+00	1.04E+00
Cadmium	7440-43-9	2.04E+03	1.92E+03	2.04E+03	1.92E+03
Chromium III	16065-83-1	8.72E+03	4.43E+04	8.72E+03	4.43E+04
Chromium VI	18540-29-9	1.02E+05	4.41E+05	1.02E+03	4.41E+03
Cobalt	7440-48-4	1.23E+05	1.15E+05	1.23E+05	1.15E+05
Copper [c]	7440-50-8	7.56E+04	7.11E+04	7.56E+04	7.11E+04
Cyanide	57-12-5	4.09E+04	3.84E+04	4.09E+04	3.84E+04
Fluoride	16984-48-8	1.23E+05	1.15E+05	1.23E+05	1.15E+05
Iron	7439-89-6	6.13E+05	5.76E+05	6.13E+05	5.76E+05
Lead [d]	7439-92-1	1.00E+03	-	1.00E+03	-
Lithium [c]	7439-93-2	4.09E+04	3.84E+04	4.09E+04	3.84E+04
Manganese	7439-96-5	6.68E+04	8.36E+04	6.68E+04	8.36E+04
Mercury	7439-97-6	6.13E+02	5.76E+02	6.13E+02	5.76E+02
Molybdenum	7439-98-7	1.02E+04	9.61E+03	1.02E+04	9.61E+03
Nickel	7440-02-0	4.09E+04	3.84E+04	4.09E+04	3.84E+04
Nitrate	1-005	>1E+6	>1E+6	>1E+6	>1E+6
Nitrite	1-005	2.04E+05	1.92E+05	2.04E+05	1.92E+05
Selenium	7782-49-2	1.02E+04	9.61E+03	1.02E+04	9.61E+03
Silver	7440-22-4	1.02E+04	9.61E+03	1.02E+04	9.61E+03
Strontium	7440-24-6	>1E+6	>1E+6	>1E+6	>1E+6
Tin	7440-31-5	>1E+6	>1E+6	>1E+6	>1E+6
Vanadium	7440-62-2	1.43E+04	1.34E+04	1.43E+04	1.34E+04
Zinc	7440-66-6	6.13E+05	5.76E+05	6.13E+05	5.76E+05

NOTES:

Values for inorganics in subsurface soil are equal to the corresponding value in surface soil (see Table 5). These values are based on PPRG calculations for specified land uses: office worker exposure to surface soil in the Industrial Use Area or open space user exposure to soil/sediment in the Open Space Use Area. All toxicity values used in calculations are from IRIS, from HEAST, or are approved by the NCEA. Analytes without PPRGs are not listed.

[a] Tier I values represent either 1.00E-04 carcinogenic risk or a hazard index (HI) of 1 for non-carcinogenic toxicity.

[b] Tier II values represent either 1.00E-06 carcinogenic risk or a hazard index (HI) of 1 for non-carcinogenic toxicity.

[c] Toxicity values for these analytes have been withdrawn or are no longer listed in HEAST or IRIS. Listed PPRG values include uncertainty due to the use of the previously-listed toxicity values.

[d] The value for lead is not a calculated PPRG, but rather is taken from EPA's *Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities* (1994).

Action levels which have a calculated value greater than 1.00E+06 (1,000,000 mg/kg) are shown as ">1E+06".

The scientific notation used for action level values in this table indicates the power of ten by which the two-decimal-place number is multiplied (e.g., 2.52E-02 = 2.52 X 10⁻² = .0252).

Table 4 - Subsurface Soil Action Levels

Analyte	CAS	Tier I		Tier II [c]
	Reference Number	Industrial Use [a] (pCi/g)	Open Space Use [b] (pCi/g)	(pCi/g)
RADIONUCLIDES:				
Americium-241	14596-10-2	209	215	38
Plutonium-239/240	10-12-8	1088	1429	252
Uranium-234	11-08-5	1627	1738	307
Uranium-235	15117-96-1	113	135	24
Uranium-238	7440-61-1	506	586	103

NOTES:

Values for radionuclides in subsurface soil are equal to the corresponding values in surface soil (see Table 5).

[a] Based on an annual dose limit of 15 mrem to an office worker.

[b] Based on an annual dose limit of 85 mrem to a hypothetical future resident.

[c] Based on an annual dose limit of 15 mrem to a hypothetical future resident.

These values apply to single radionuclides only. In order to account for the total dose from multiple radionuclides, sum-of-ratios calculations will be applied to all radionuclides which are present above background. Actual values that trigger actions will therefore likely be lower than the values listed in this table.

Action levels for other radionuclides will be determined as necessary and in the same manner used to calculate the values listed in this table.

Table 5 - Surface Soil Action Levels

Analyte	CAS Reference Number	Tier I [a]		Tier II [b]	
		Industrial Use (mg/kg)	Open Space Use (mg/kg)	Industrial Use (mg/kg)	Open Space Use (mg/kg)
Acenaphthene	83-32-9	1.23E+05	1.15E+05	1.23E+05	1.15E+05
Acetone	67-64-1	2.04E+05	1.92E+05	2.04E+05	1.92E+05
Aldrin	309-00-2	3.37E+01	2.64E+01	3.37E-01	2.64E-01
Aluminum	7429-90-5	>1E+06	>1E+06	>1E+06	>1E+06
Ammonium	7664-41-7	>1E+06	>1E+06	>1E+06	>1E+06
Anthracene	120-12-7	6.13E+05	5.76E+05	6.13E+05	5.76E+05
Antimony	7440-36-0	8.18E+02	7.68E+02	8.18E+02	7.68E+02
Aroclor-1016	12674-11-2	2.86E+02	2.24E+02	2.86E+00	2.24E+00
Aroclor-1221	11104-28-2	2.86E+02	2.24E+02	2.86E+00	2.24E+00
Aroclor-1232	11141-16-5	2.86E+02	2.24E+02	2.86E+00	2.24E+00
Aroclor-1242	53469-21-9	2.86E+02	2.24E+02	2.86E+00	2.24E+00
Aroclor-1248	12672-29-6	2.86E+02	2.24E+02	2.86E+00	2.24E+00
Aroclor-1254	11097-69-1	2.86E+02	2.24E+02	2.86E+00	2.24E+00
Aroclor-1260	11096-82-5	2.86E+02	2.24E+02	2.86E+00	2.24E+00
Arsenic	7440-38-2	3.81E+02	2.99E+02	3.81E+00	2.99E+00
Barium	7440-39-3	1.34E+05	1.33E+05	1.34E+05	1.33E+05
Benzene	71-43-2	1.97E+04	1.55E+04	1.97E+02	1.55E+02
alpha-BHC	319-84-6	9.08E+01	7.11E+01	9.08E-01	7.11E-01
beta-BHC	319-85-7	3.18E+02	2.49E+02	3.18E+00	2.49E+00
gamma-BHC [Lindane]	58-89-9	4.40E+02	3.45E+02	4.40E+00	3.45E+00
Benzo(a)anthracene	56-55-3	7.84E+02	6.14E+02	7.84E+00	6.14E+00
Benzo(a)pyrene	50-32-8	7.84E+01	6.14E+01	7.84E-01	6.14E-01
Benzo(b)fluoranthene	205-99-2	7.84E+02	6.14E+02	7.84E+00	6.14E+00
Benzo(k)fluoranthene	207-08-9	7.84E+03	6.14E+03	7.84E+01	6.14E+01
Benzoic Acid	65-85-0	>1E+06	>1E+06	>1E+06	>1E+06
Benzyl Alcohol	100-51-6	6.13E+05	5.76E+05	6.13E+05	5.76E+05
Beryllium	7440-41-7	1.33E+02	1.04E+02	1.33E+00	1.04E+00
Bromodichloromethane	75-27-4	9.23E+01	7.23E+01	9.23E+01	7.23E+01
Bromoform [Tribromomethane]	75-25-2	7.24E+02	5.67E+02	7.24E+02	5.67E+02
Bromomethane [Methyl bromide]	74-83-9	2.86E+03	2.69E+03	2.86E+03	2.69E+03
2-Butanone [Methyl ethyl ketone]	78-93-3	>1E+06	>1E+06	>1E+06	>1E+06
Butylbenzylphthalate	85-68-7	4.09E+05	3.84E+05	4.09E+05	3.84E+05
Cadmium	7440-43-9	2.04E+03	1.92E+03	2.04E+03	1.92E+03
Carbon disulfide	75-15-0	2.04E+05	1.92E+05	2.04E+05	1.92E+05
Carbon tetrachloride	56-23-5	4.40E+03	3.45E+03	4.40E+01	3.45E+01
alpha-Chlordane	5103-71-9	1.63E+03	1.28E+03	1.63E+01	1.28E+01
beta-Chlordane	5103-74-2	1.63E+03	1.28E+03	1.63E+01	1.28E+01
gamma-Chlordane	5103-74-2	1.63E+03	1.28E+03	1.63E+01	1.28E+01
4-Chloroaniline	106-47-8	8.18E+03	7.68E+03	8.18E+03	7.68E+03
Chlorobenzene	108-90-7	4.09E+04	3.84E+04	4.09E+04	3.84E+04
Chloroethane	75-00-3	1.97E+05	1.55E+05	1.97E+03	1.55E+03
bis(2-Chloroethyl)ether	111-44-4	5.20E+02	4.07E+02	5.20E+00	4.07E+00
Chloroform [Trichloromethane]	67-66-3	9.38E+04	7.35E+04	9.38E+02	7.35E+02
bis(2-Chloroisopropyl)ether	108-60-1	8.17E+03	6.40E+03	8.17E+01	6.40E+01
Chloromethane [Methyl chloride]	74-87-3	4.40E+04	3.45E+04	4.40E+02	3.45E+02
2-Chloronaphthalene	91-58-7	1.64E+05	1.64E+05	1.64E+05	1.54E+05
2-Chlorophenol	95-57-8	1.02E+04	9.61E+03	1.02E+04	9.61E+03
Chromium III	16065-83-1	8.72E+03	4.43E+04	8.72E+03	4.43E+04
Chromium VI	18540-29-9	1.02E+05	4.41E+05	1.02E+03	4.41E+03
Chrysene	218-01-9	7.84E+04	6.14E+04	7.84E+02	6.14E+02
Cobalt	7440-48-4	1.23E+05	1.15E+05	1.23E+05	1.15E+05
Copper [c]	7440-50-8	7.56E+04	7.11E+04	7.56E+04	7.11E+04
Cyanide	57-12-5	4.09E+04	3.84E+04	4.09E+04	3.84E+04

Table 5 - Surface Soil Action Levels

Analyte	CAS Reference Number	Tier I [a]		Tier II [b]	
		Industrial Use (mg/kg)	Open Space Use (mg/kg)	Industrial Use (mg/kg)	Open Space Use (mg/kg)
4,4-DDD	72-54-8	2.38E+03	1.87E+03	2.38E+01	1.87E+01
4,4-DDE	72-55-9	1.68E+03	1.32E+03	1.68E+01	1.32E+01
4,4-DDT	50-29-3	1.68E+03	1.32E+03	1.68E+01	1.32E+01
Dibenzo(a,h)anthracene	53-70-3	7.84E+01	6.14E+01	7.84E-01	6.14E-01
Dibenzofuran	132-64-9	8.18E+03	7.68E+03	8.18E+03	7.68E+03
Dibromochloromethane	124-48-1	6.81E+03	5.34E+03	6.81E+01	5.34E+01
Di-n-butylphthalate	84-74-0	2.04E+05	1.92E+05	2.04E+05	1.92E+05
1,2-Dichlorobenzene	95-50-1	1.84E+05	1.73E+05	1.84E+05	1.73E+05
1,4-Dichlorobenzene	106-46-7	2.38E+04	1.87E+04	2.38E+02	1.87E+02
3,3-Dichlorobenzidine	91-94-1	1.27E+03	9.96E+02	1.27E+01	9.96E+00
1,1-Dichloroethane	75-34-3	2.04E+05	1.92E+05	2.04E+05	1.92E+05
1,2-Dichloroethane	107-06-2	6.29E+03	4.93E+03	6.29E+01	4.93E+01
1,1-Dichloroethene	75-35-4	9.54E+02	7.47E+02	9.54E+00	7.47E+00
1,2-Dichloroethene (total)	540-59-0	1.84E+04	1.73E+04	1.84E+04	1.73E+04
2,4-Dichlorophenol	120-83-2	6.13E+03	5.76E+03	6.13E+03	5.76E+03
1,2-Dichloropropane	78-87-5	8.42E+03	6.59E+03	8.42E+01	6.59E+01
cis-1,3-Dichloropropene	1006-01-5	3.18E+03	2.49E+03	3.18E+01	2.49E+01
trans-1,3-Dichloropropene	10061-02-6	3.18E+03	2.49E+03	3.18E+01	2.49E+01
Dieldrin	60-57-1	3.57E+01	2.80E+01	3.57E-01	2.80E-01
Diethylphthalate	84-66-2	>1E+06	>1E+06	>1E+06	>1E+06
2,4-Dimethylphenol	105-67-9	4.09E+04	3.84E+04	4.09E+04	3.84E+04
Dimethylphthalate	131-11-3	>1E+06	>1E+06	>1E+06	>1E+06
4,6-Dinitro-2-methylphenol	534-52-1	2.04E+02	1.92E+02	2.04E+02	1.92E+02
2,4-Dinitrophenol	51-28-5	4.09E+05	3.84E+05	4.09E+03	3.84E+03
2,4-Dinitrotoluene	121-14-2	8.42E+02	6.59E+02	8.42E+00	6.59E+00
2,6-Dinitrotoluene	606-20-2	8.42E+02	6.59E+02	8.42E+00	6.59E+00
Di-n-octylphthalate	117-84-0	>1E+06	>1E+06	4.09E+04	3.84E+04
Endosulfan I [c]	959-98-8	>1E+06	>1E+06	1.23E+04	1.15E+04
Endosulfan II [c]	33213-65-9	>1E+06	>1E+06	1.23E+04	1.15E+04
Endosulfan sulfate [c]	1031-07-8	>1E+06	>1E+06	1.23E+04	1.15E+04
Endosulfan (technical) [c]	115-29-7	>1E+06	>1E+06	1.23E+04	1.15E+04
Endrin (technical)	72-26-8	6.13E+02	2.30E+03	6.13E+02	5.76E+02
Ethylbenzene	100-41-4	2.04E+05	1.92E+05	2.04E+05	1.92E+05
bis(2-Ethylhexyl)phthalate	117-81-7	4.09E+04	3.20E+04	4.09E+02	3.20E+02
Fluoranthene	206-44-0	8.18E+04	7.68E+04	8.18E+04	7.68E+04
Fluorene	86-73-7	8.18E+04	7.68E+04	8.18E+04	7.68E+04
Fluoride	16984-48-8	1.23E+05	1.15E+05	1.23E+05	1.15E+05
Heptachlor	76-44-8	1.27E+02	9.96E+01	1.27E+00	9.96E-01
Heptachlor epoxide	1024-57-3	6.29E+01	4.93E+01	6.29E-01	4.93E-01
Hexachlorobenzene	118-74-1	3.58E+02	2.80E+02	3.58E+00	2.80E+00
Hexachlorobutadiene	87-68-3	7.34E+03	5.75E+03	7.34E+01	5.75E+01
Hexachlorocyclopentadiene	77-47-4	1.37E+04	1.33E+04	1.37E+04	1.33E+04
Hexachloroethane	67-72-1	4.09E+04	1.25E+05	4.09E+02	3.20E+02
Indeno(1,2,3-cd)pyrene	193-39-5	7.84E+02	6.14E+02	7.84E+00	6.14E+00
Iron	7439-89-6	6.13E+05	5.76E+05	6.13E+05	5.76E+05
Isophorone	78-59-1	6.02E+05	>1E+06	6.02E+03	4.72E+03
Lead [d]	7439-92-1	1.00E+03	-	1.00E+03	-
Lithium [c]	7439-93-2	4.09E+04	3.84E+04	4.09E+04	3.84E+04
Manganese	7439-96-5	6.68E+04	8.36E+04	6.68E+04	8.36E+04
Mercury	7439-97-6	6.13E+02	5.76E+02	6.13E+02	5.76E+02
Methoxychlor	72-43-5	1.02E+04	9.61E+03	1.02E+04	9.61E+03
Methylene chloride [Dichloromethane]	75-09-2	7.63E+04	2.39E+05	7.63E+02	5.98E+02
2-Methylnaphthalene	91-57-6	8.18E+04	7.68E+04	8.18E+04	7.68E+04

Table 5 - Surface Soil Action Levels

Analyte	CAS Reference Number	Tier I [a]		Tier II [b]	
		Industrial Use (mg/kg)	Open Space Use (mg/kg)	Industrial Use (mg/kg)	Open Space Use (mg/kg)
4-Methyl-2-pentanone [Isopropylacetone]	108-10-1	1.64E+05	1.54E+05	1.64E+05	1.54E+05
2-Methylphenol	95-48-7	1.02E+05	9.61E+04	1.02E+05	9.61E+04
4-Methylphenol	106-44-5	1.02E+04	9.61E+03	1.02E+04	9.61E+03
Molybdenum	7439-98-7	1.02E+04	9.61E+03	1.02E+04	9.61E+03
Naphthalene [c]	91-20-3	8.18E+04	7.68E+04	8.18E+04	7.68E+04
Nickel	7440-02-0	4.09E+04	3.84E+04	4.09E+04	3.84E+04
Nitrate	1-005	>1E+06	>1E+06	>1E+06	>1E+06
Nitrite	1-005	2.04E+05	1.92E+05	2.04E+05	1.92E+05
2-Nitroaniline	88-74-4	1.23E+02	1.15E+02	1.23E+02	1.15E+02
Nitrobenzene	98-95-3	1.02E+03	9.61E+02	1.02E+03	9.61E+02
4-Nitrophenol	100-02-7	1.64E+04	1.54E+04	1.64E+04	1.54E+04
n-Nitrosodiphenylamine	86-30-6	1.17E+05	3.65E+05	1.17E+03	9.15E+02
n-Nitrosodipropylamine	621-64-7	8.17E+01	6.40E+01	8.17E-01	6.40E-01
Pentachlorophenol	87-86-5	4.77E+03	1.49E+04	4.77E+01	3.74E+01
Phenol	108-95-2	>1E+06	>1E+06	>1E+06	>1E+06
Pyrene	129-00-0	6.13E+04	5.76E+04	6.13E+04	5.76E+04
Selenium	7782-49-2	1.02E+04	9.61E+03	1.02E+04	9.61E+03
Silver	7440-22-4	1.02E+04	9.61E+03	1.02E+04	9.61E+03
Strontium	7440-24-6	>1E+06	>1E+06	>1E+06	>1E+06
Styrene	100-42-5	4.09E+05	3.84E+05	4.09E+05	3.84E+05
1,1,2,2-Tetrachloroethane	79-34-5	2.86E+03	2.24E+03	2.86E+01	2.24E+01
Tetrachloroethene	127-18-4	1.10E+04	8.62E+03	1.10E+02	8.62E+01
Tin	7440-31-5	>1E+06	>1E+06	>1E+06	>1E+06
Toluene	108-88-3	4.09E+05	3.84E+05	4.09E+05	3.84E+05
Toxaphene	8001-35-2	5.20E+02	4.07E+02	5.20E+00	4.07E+00
1,2,4-Trichlorobenzene	120-82-1	2.04E+04	1.92E+04	2.04E+04	1.92E+04
1,1,1-Trichloroethane	71-55-6	4.09E+04	3.84E+04	4.09E+04	3.84E+04
1,1,2-Trichloroethane	79-00-5	1.00E+04	3.14E+04	1.00E+02	7.86E+01
Trichloroethene	79-01-6	5.20E+04	1.63E+05	5.20E+02	4.07E+02
2,4,5-Trichlorophenol	95-95-4	2.04E+05	1.92E+05	2.04E+05	1.92E+05
2,4,6-Trichlorophenol	88-06-2	5.20E+04	1.59E+05	5.20E+02	4.07E+02
Vanadium	7440-62-2	1.43E+04	1.34E+04	1.43E+04	1.34E+04
Vinyl acetate	108-05-4	>1E+06	>1E+06	>1E+06	>1E+06
Vinyl chloride	75-01-4	3.01E+02	2.36E+02	3.01E+00	2.36E+00
Xylene (total)	1330-20-7	>1E+06	>1E+06	>1E+06	>1E+06
Zinc	7440-66-6	6.13E+05	5.76E+05	6.13E+05	5.76E+05

NOTES:

Values are based on PPRG calculations for specified land uses: office worker exposure to surface soil in the Industrial Use Area or open space user exposure to soil/sediment in the Open Space Use Area. All toxicity values used in calculations are from IRIS, from HEAST, or are approved by the NCEA. Analytes without PPRGs are not listed.

[a] Tier I values represent either 1.00E-04 carcinogenic risk or a hazard index (HI) of 1 for non-carcinogenic toxicity.

[b] Tier II values represent either 1.00E-06 carcinogenic risk or a hazard index (HI) of 1 for non-carcinogenic toxicity.

[c] Toxicity values for these chemicals have been withdrawn or are no longer listed in HEAST or IRIS. Listed PPRG values include uncertainty due to the use of the previously-listed toxicity values.

[d] The value for lead is not a calculated PPRG, but rather is taken from EPA's *Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities* (1994).

The scientific notation used in this table indicates the power of ten by which the two-decimal-place number is multiplied (e.g., 2.52E-02 = 2.52 X 10⁻² = .0252).

Action levels which have a calculated value greater than 1.00E+06 mg/kg (1,000,000 mg/kg) are shown as ">1E+06".

Table 5 - Surface Soil Action Levels

Analyte	CAS	Tier I		Tier II [c]
	Reference	Industrial Use [a]	Open Space Use [b]	(pCi/g)
	Number	(pCi/g)	(pCi/g)	
RADIONUCLIDES:				
Americium-241	14596-10-2	209	215	38
Plutonium-239/240	10-12-8	1088	1429	252
Uranium-234	11-08-5	1627	1738	307
Uranium-235	15117-96-1	113	135	24
Uranium-238	7440-61-1	506	586	103

NOTES:

[a] Based on an annual dose limit of 15 mrem to an office worker.

[b] Based on an annual dose limit of 85 mrem to a hypothetical future resident.

[c] Based on an annual dose limit of 15 mrem to a hypothetical future resident.

These values apply to single radionuclides only. In order to account for the total dose from multiple radionuclides, sum-of-ratios calculations will be applied to all radionuclides which are present above background. Actual values that trigger actions will therefore likely be lower than the values listed in this table.

Action levels for other radionuclides will be determined as necessary and in the same manner used to calculate the values listed in this table.

RFCA REGULATORY MILESTONES

FY00

FY00-M2	Complete demolition to slab of B779 by 9/30/00
FY00-M5	Ship 6000m3 of LL/LLMW between 10/1/99 and 9/30/00
FY00-M6	Complete 86 shipments to WIPP during FY00. This assumes WIPP is open and remains open during the fiscal year; WIPP receives a RCRA disposal permit and can accept Rocky Flats TRU and TRM by February 2000. NMED certifies shipments of Rocky Flats waste to WIPP by February 2000.
FY00-new	Store TRU waste in B906 by September 1, 2000. If B906 is needed prior to September 1, 2000, for TRU waste storage, then B906 must be ready in time to not impact residues or D&D. (ie. Slowing down the generation rate of TRU waste is not an acceptable means of meeting this milestone).
FY00-new	Complete 18 D&D worksets between 10/1/99 and 9/30/00.

FY01

FY01-new	By 9/30/01, complete 30 D&D worksets in addition to the 18 worksets required under the FY00 D&D workset milestone.
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RFCA Documents Index

1. Quality Assurance Criteria Document, Rev. 1, Kaiser-Hill Company L.L.C., effective February 2, 1996 (Or most current version).
2. U.S. Department of Energy, Historical Release Report for the Rocky Flats Plant, Volumes I and II, June 1992.
3. Existing ER Standard Operating Procedures.
4. U.S. Department of Energy, Rocky Flats Site-wide Integrated Public Involvement Plan, U.S. Department of Energy, March 1998.
5. Treatability Study Work plans listed in the Administrative Record.
6. Health and Safety Practices Manual, EG&G Rocky Flats, Inc., (Adopted by Kaiser-Hill Company, L.L.C. in July 1995) September 30, 1995 (Or most current version).
7. U.S. Department of Energy, Plan for Prevention of Contaminant Dispersion, February 1992.
8. U.S. Department of Energy, Background Geochemical Characterization Report, Rocky Flats Plant, September 30, 1993.
9. Final Treatability Studies Plan, Volumes I and II, August 1991.
10. Final resolutions of previous disputes that are relevant to implementation of RFCA. The Administrative Record shall be reviewed for such resolutions, and this list will be updated accordingly.
11. U.S. Department of Energy, Rocky Flats Environmental Technology Site, Integrated Monitoring Plan FY98/FY99, October 1998.
12. U.S. Department of Energy, Decommissioning Program Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, October 8, 1998. Approved by CDPHE on November 4, 1998. Approved by EPA on November 12, 1998.
13. U.S. Department of Energy, Modification to the Decommissioning Program Plan, December 1998. Approved by CDPHE and EPA on December 22, 1998.
14. U.S. Department of Energy, Modification to the Decommissioning Program Plan, June 1999. CDPHE and EPA approved the modification on June 21, 1999.

PAMs

1. U.S. Department of Energy, Proposed Action Memorandum Hotspot Removal Rocky Flats Plant Operable Unit 1, Rocky Flats Plant, Golden, Colorado, September 1994.

2. U.S. Department of Energy, Final Proposed Action Memorandum Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, May 1995.
3. U.S. Department of Energy, Modified Proposed Action Memorandum Passive Seep Collection and Treatment Operable Unit 7, Rocky Flats Environmental Technology Site, Golden, Colorado, July 1995.
4. U.S. Department of Energy, Modified Proposed Action Memorandum Passive Seep Collection and Treatment Operable Unit 7, minor modification, July 1998.
5. U.S. Department of Energy, Final Proposed Action Memorandum for the Remediation of Individual Hazardous Substance Site 109, Ryan's Pit, Rocky Flats Environmental Technology Site, Golden, Colorado, August 24, 1995.
6. U.S. Department of Energy, Final Proposed Action Memorandum Remediation and Draft Modification of Colorado Hazardous Waste Corrective Action Section of the Operating Permit for Rocky Flats Environmental Technology Site, Golden, Colorado, October 1995.
7. U.S. Department of Energy, Draft Proposed Action Memorandum Remediation for the Contaminant Stabilization of Underground Storage Tanks, Rocky Flats Environmental Technology Site, Golden, Colorado, February 14, 1996.
8. U.S. Department of Energy, Proposed Action Memorandum for the Source Removal at Trenches T-3 and T-4, IHSSs 110 and 111.1, Rocky Flats Environmental Technology Site, Golden, Colorado, August 24, 1995.
9. U.S. Department of Energy, Final Proposed Action Memorandum for the Source Removal at the Mound Site, IHSS 113, Revision 0, Rocky Flats Environmental Technology Site, Golden, Colorado, February 3, 1997. Approved by EPA in February 1997.
10. U.S. Department of Energy, Final Proposed Action Memorandum for the Source Removal at Trench 1, IHSS 108, Rocky Flats Environmental Technology Site, Golden, Colorado, July 1997. Approved by EPA on August 27, 1997.
11. U.S. Department of Energy, Final Proposed Action Memorandum for the Source Removal at Trench 1, IHSS 108, modification, February 1998. EPA approved the modification in March 1998.
12. U.S. Department of Energy, Building 123, Proposed Action Memorandum, Rocky Flats Environmental Technology Site, Golden, Colorado, August 1997. Approved by CDPHE on August 25, 1997.
13. U.S. Department of Energy, Building 123 Proposed Action Memorandum, minor modification, May 21, 1998.
14. U.S. Department of Energy, Proposed Action Memorandum (PAM) for Decommissioning Building Cluster 980 (B980), Revision 0, Rocky Flats Environmental Technology Site, Golden, Colorado, August 15, 1997. Approved by CDPHE on August 25, 1997.

15. U.S. Department of Energy, Final Proposed Action Memorandum for the East Trenches Plume, Rocky Flats Environmental Technology Site, Golden, Colorado, February 4, 1999. Approved by EPA in February 1999.
16. U.S. Department of Energy, Final Proposed Action Memorandum for the East Trenches Plume, field modification. Approved by EPA and CDPHE on June 2, 1999.

IM/IRAs and Decommissioning Operation Plans

1. U.S. Department of Energy, Final Interim Measures/Interim Remedial Action Decision Document for Rocky Flats Industrial Area, Rocky Flats Environmental Technology Site, Golden, Colorado, November 1994.
2. U.S. Department of Energy, Operable Unit 4 Solar Evaporation Ponds Interim Measures/Interim Remedial Action Environmental Assessment Decision Document, Rocky Flats Environmental Technology Site, Golden, Colorado, April 9, 1992.
3. U.S. Department of Energy, Interim Measures/Interim Remedial Action Plan and Decision Document, 881 Hillside Area, Operable Unit No. 1, Rocky Flats Plant, Golden, Colorado, January 1990.
4. U.S. Department of Energy, Final Surface Water Interim Measures/Interim Remedial Action Plan/Environmental Assessment and Decision Document South Walnut Creek Basin, Rocky Flats Plant, Golden, Colorado, October 1994.

NOTE: The last two IM/IRA references (January 1990 IM/IRA for the 881 Hillside and the October 1994 IM/IRA for the South Walnut Creek Basin) were administratively combined in 1995.

5. U.S. Department of Energy, Modification to the Final Surface Water Interim Remedial Action Plan Environmental Assessment and Decision Document South Walnut Creek Basin dated October 1994. Approved by EPA on July 11, 1997.
6. U.S. Department of Energy, Modification to the Interim Measures/Interim Remedial Action Plan and Decision Document, 881 Hillside Area Operable Unit No. 1, dated January 1990. Conditionally approved by EPA on August 27, 1997.
7. U.S. Department of Energy, Final Mound Site Plume Decision Document, Major Modification to the Final Surface Water Interim Measures/Interim Remedial Action Plan/ Environmental Assessment and Decision Document for South Walnut Creek March 1991, Revised October 1994, Rocky Flats Environmental Technology Site, Golden, Colorado, September 30, 1997. Approved by EPA in September 1997.
8. U.S. Department of Energy, Termination of the Final Surface Water Interim Remedial Action Plan Environmental Assessment and Decision Document South Walnut Creek Basin dated October 1994, July 28, 1998.
9. U.S. Department of Energy, Interim Measure/Interim Remedial Action Decision Document, National Conversion Pilot Project, Stage II, Rocky Flats Field Office, Golden, Colorado, March 30, 1995.

NOTE: Although this IM/IRA is regulated under RFCA, the IM/IRA provides that the activities conducted under the IM/IRA shall not become regulatory milestones. Further, the National Conversion Pilot Project work is funded in accordance with a Cooperative Assistance Agreement, and not through normal RFETS budget planning. The work being done under this IM/IRA ceased upon expiration of the funds provided under the Cooperative Assistance Agreement for Stage II. The IM/IRA work was not included in the Integrated Sitewide Baseline.

10. U.S. Department of Energy, Corrective Action Management Unit Interim Measure/Interim Remedial Action Decision Document and Application Support Document for Containerized Storage at the Rocky Flats Environmental Technology Site, Golden, Colorado, Final, August 1997. Approved by CDPHE on August 28, 1997.
11. U.S. Department of Energy, Corrective Action Management Unit Interim Measure/Interim Remedial Action Decision Document and Application Support Document for Bulk Storage at the Rocky Flats Environmental Technology Site, Golden, Colorado, Final, August 1997. Approved by CDPHE on August 28, 1997.
12. U.S. Department of Energy, Decommissioning Operations Plan for the 779 Cluster Interim Measure/Interim Remedial Action, Rocky Flats Environmental Technology Site, Golden, Colorado, February 1998. Approved by CDPHE on February 6, 1998.
13. U.S. Department of Energy, Decommissioning Operations Plan, for the 779 Cluster Interim Measure/Interim Remedial Action, modification, June 2, 1998.
14. U.S. Department of Energy, Decommissioning Operations Plan for the Building 779 Cluster, modification, October 12, 1998. The modification included the demolition plan for Building 729. The modification was approved by CDPHE on November 13, 1998.
15. U.S. Department of Energy, Decommissioning Operations Plan for the Building 779 Cluster, modification, February 16, 1999. Approved by CDPHE on February 19, 1999.
16. U.S. Department of Energy, Decommissioning Operations Plan for the Building 779 Cluster, minor modification, May 1999. Approved by CDPHE on May 20, 1999.
17. U.S. Department of Energy, Decommissioning Operations Plan for the Building 779 Cluster modification to include the 779 Cluster Demolition Plan. Approved by CDPHE on July 27, 1999.
18. U.S. Department of Energy, Building 886 Cluster Closure Project Interim Measure/Interim Remedial Action, Rocky Flats Environmental Technology Site, Golden, Colorado, July 30, 1998. Approved by CDPHE on August 3, 1998.
19. U.S. Department of Energy, Building 771/774 Closure Project Decommissioning Operations Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, December 1998. Approved by CDPHE on January 11, 1999.
20. U.S. Department of Energy, Building 776/777 Closure Project Decommissioning Operations Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, November 3, 1999. Approved by CDPHE on November 5, 1999.

21. U.S. Department of Energy, the Decommissioning Operations Plan for 776/777, minor modification, December 9, 1999. Approved by CDPHE on December 15, 1999.
22. U.S. Department of Energy, Interim Measure/Interim Remedial Action for the Solar Ponds Plume Remediation Project, Rocky Flats Environmental Technology Site, Golden, Colorado, June 11, 1999. Approved by CDPHE on June 11, 1999.
23. U.S. Department of Energy, Interim Measure/Interim Remedial Action for the Solar Ponds Plume Remediation Project, field modification. Approved by CDPHE and EPA on August 31, 1999.
24. U.S. Department of Energy, Interim Measure/Interim Remedial Action for the Solar Ponds Plume Remediation Project field modification. Approved by CDPHE and EPA on August 31, 1999.

RSOPs

1. U.S. Department of Energy, RFCA Standard Operating Protocol (RSOP) for the Disposition of Concrete Rubble, Rocky Flats Environmental Technology Site, Golden, Colorado, October 18, 1999. Approved by CDPHE and EPA on October 18, 1999.

CAD/RODs

1. U.S. Department of Energy, Corrective Action Decision/Record of Decision, Operable Unit 11: West Spray Field, Rocky Flats Environmental Technology Site, Golden, Colorado, September 1995. Approved October 1995.
2. U.S. Department of Energy, Corrective Action Decision/Record of Decision, Operable Unit 15: Inside Building Closures, Rocky Flats Environmental Technology Site, Golden, Colorado, September 1995. Approved October 1995.
3. U.S. Department of Energy, Corrective Action Decision/Record of Decision, Operable Unit 16: Low Priorities Sites, Rocky Flats Environmental Technology Site, Golden, Colorado, August 1994. Approved October 1994.
4. U.S. Department of Energy, Corrective Action Decision/Record of Decision, Operable Unit 1, Rocky Flats Environmental Technology Site, Golden, Colorado, March 1997. Approved March 1997.
5. U.S. Department of Energy, Corrective Action Decision/Record of Decision, Operable Unit 3, Rocky Flats Environmental Technology Site, Golden, Colorado, April 1997. Approved June 1997.

The Rocky Flats Closure Project Baseline (CPB) has replaced the Summary Level Baseline. The Rocky Flats Closure Project Completion Metrics Baseline has been updated through January 31, 2000 and is included in this appendix; however, the CPB is under review. To obtain a copy of the most recent version of the CPB, please contact the DOE RFCA Project Coordinator, Joseph A. Legare at (303) 966-5918.

ROCKY FLATS 2006 CLOSURE PROJECT METRICS BASELINE

	Key Closure Activities	4th Quarter FY95 Actuals	FY96 Actuals	FY97 Actuals	FY98 Actuals	FY99 Actuals	Oct-2000 Actuals
	SNM Shipments						
	Pits shipped (percent of inventory)	0	0	34	33	33	0
	eU shipped (percent of inventory)	0	0	0	22	78	0
	Composites/Contaminated eU shipped (# of containers)	0	0	0	0	0	0
	Pu Metals and Oxides shipped (# of containers)	0	0	0	0	41	9
	Place Pu Metals & Oxides in 3013 (# of containers)	0	0	0	0	0	0
	Drain B371 Areas	NA	NA	0	2	10	0
	Drain & Remove B771 Liquid Systems	NA	NA	0	2	13	3
	Residues (kg bulk)						
	Salt - Disposition Salt Residues	0	0	0	988	5,023	2,290
	Ash - Repackage SS&C	0	0	0	799	0	Metric Deleted, per CP00-1003
	Ash - Ship SS&C to SRS	0	0	0	0	100	Metric Deleted, per CP00-1003
	Ash - Disposition SS&C	0	0	0	0	0	0
	Ash - Disposition Ash/Graphite Fines	0	0	0	0	7,995	3,089
	Combustibles - Disposition Wet Combustibles	0	0	0	0	7,396	1,929
	Combustibles - Ship fluoride to SRS	0	0	0	0	0	0
	Inorganic - Dry Repackage	0	0	0	3,217	10,243	3,961
	Inorganic - Disposition TRU IDC 301 Graphite Shapes	0	0	0	0	0	0
	Inorganic - Ship Scrub Alloy Containers	0	0	0	0	90	90
	Waste Shipments						
	Ship Low-Level Mixed Waste for disposal (m ³)	296	1,228	2,582	6,527	5,866	431
	Ship Low-Level Waste for disposal (m ³)	105	43	1,288	2,627	5,361	2,651
	Ship TRU/TRM Waste for disposal (m ³)	0	0	0	0	65	61
	Ship Sanitary Waste for disposal (tons)	1,180	1,180	2,079	3,189	2,355	1,318
	Decommissioning						
	Demolish Buildings & Facilities - Type 1 (# of facilities)	3	10	19	10	6	18
	Type 1 (square feet)	786	12,906	53,026	7,202	247	5,114
	Demolish Buildings & Facilities - Type 2 (# of facilities)	0	4	0	2	4	0
	Major Type 2 Buildings						
	Type 2 (square feet)	0	16,370	0	18,976	7,982	0
	Demolish Buildings & Facilities - Type 3 (# of facilities)	0	0	0	0	0	1
	Major Type 3 Buildings						779
	Type 3 (square feet)	0	0	0	0	0	64,790
	Environmental Restoration						
	Remediate Environmental Sites (#)	0	21	1	2	2	0
	Excess Material						
	Disposition Property (#)	2,236	4,554	32,444	32,508	67,825	34,178
	Disposition Classified Matter (#)	0	0	2,850,400	148,105	804	129
	Closeout						
	Site Regrade & Project Closeout	0	0	0	0	0	0

RFCA Target Activities for FY00 Through FY03

FY00

T1	Complete eU shipments, except eU contaminated with plutonium. (Uncertainties beyond RFFO control are acknowledged to exist in the availability of receiver sites and transportation corridors.)
T2	Install and operate the Plutonium Packaging System in Building 371 by March.
T3	Close Material Access Area in Building 776.

FY01

T1	Complete offsite shipments of fluorides. (Uncertainties beyond RFFO control are acknowledged to exist in the availability of receiver sites and transportation corridors.)
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FY02

T1	Repackage Pu inorganic oxide and wet combustible residues.
T2	Complete salt stabilization
T3	Complete offsite shipment of Pu metal and oxide. (Does not include SNM generated during holdup removal activities). (Uncertainties beyond RFFO control are acknowledged to exist in the availability of receiver sites and transportation corridors.)
T4	Close Material Access Area in Building 707.
T5	Close Material Access Area in Building 371.

FY03

T1	Complete offsite shipment of Pu metal and oxide from holdup removal activities.
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CONTROLLED DOCUMENT INSTRUCTIONS

To Distribution

Revision/Mailing:

From Chandra Bezjak
Document Control
T130G
Ext. 3379

This package represents a modification to the Rocky Flats Cleanup Agreement

DOCUMENT

Transmittal Notice dated 5/04/2000

Instructions for the Rocky Flats Cleanup Agreement
Update from Document Control PADC-1998-00779

Letter 00-DOE-02040 dated March 21,2000

Attachment 4
Dated March 21,2000

Attachment 5
Dated March 21,2000

Attachment 8
Dated March 21,2000

Attachment 12
Dated March 21,2000

Appendix 4
Dated March 21,2000

Appendix 6
Dated March 21,2000

REQUIRED ACTION

Read, sign and send back to
Document Control, T130G

None

Read and place at front of
RFCA

Please replace Attachment 4
in RFCA

Please replace Attachment 5
in RFCA

Please replace Attachment 8
in RFCA

Please replace Attachment 12
in RFCA

Please replace Appendix 4
in RFCA

Please replace Appendix 6
in RFCA

All documents are divided by a single Document Separation Sheet.



Colorado Department
of Public Health
and Environment

MAR 21 2000



00-DOE-02040

Dear Stakeholder:

The Rocky Flats Cleanup Agreement (RFCA) originally signed on July 19, 1996, is being updated in accordance with its provisions. Today the Colorado Department of Public Health and Environment, the Environmental Protection Agency Region VIII, and the Department of Energy are releasing substitute update pages reflecting the current updates.

The following Attachments and Appendices dated March 21, 2000, are being updated:

1. Attachment 4, Environmental Restoration (ER) Ranking, is being updated to provide the fiscal year 1999 ER Ranking. Today's version replaces the ER Ranking dated February 26, 1999.
2. Attachment 5, Action Level and Standards Framework (ALF), is being updated to incorporate proposed modifications and comments received during the 1999 public comment period. Today's version replaces the ALF dated July 19, 1999, including errata substitute pages dated April 16, 1997.
3. Attachment 8 is being updated to reflect enforceable milestones for fiscal year 2000 and an outyear milestone for fiscal year 2001. Today's version replaces the RFCA Regulatory Milestones dated February 26, 1999.
4. Attachment 12 is being updated to reflect the approved decision documents. Today's version replaces the list of approved decision documents dated February 26, 1999.
5. Appendix 4 is being updated to reflect the current Rocky Flats Closure Project Completion Metrics Baseline, which is in place of the Summary Level Baseline. Today's version replaces the Rocky Flats Closure Project Completion Metrics Baseline dated February 26, 1999.
6. Appendix 6 is being updated to reflect target activities for fiscal years 2000, 2001, 2002, and 2003. Today's version replaces the target activities dated February 26, 1999.

The attachment to this letter provides substitute RFCA update pages dated March 21, 2000. The RFCA update pages should be inserted in the July 19, 1996, RFCA in lieu of the corresponding pages dated July 19, 1996, April 16, 1997, or February 26, 1999. The July 19, 1996, version of RFCA with replacement pages dated April 16, 1997, March 21, 2000, and the 1999 Implementation Guidance Document shall constitute the official version of RFCA. Changes have been made in a manner to ensure continuity of text between the preceding page, the updated page, and the subsequent page.

ENVIRONMENTAL RESTORATION RANKING

A prioritized list of Environmental Restoration (ER) locations was originally developed to select the top priority locations for remediation. The ER Ranking will no longer be the sole source for identifying the remedial action sequence. The RFCA Parties recognize that future remedial actions will be addressed based on opportunity and D&D schedules. This opportunistic approach will evaluate the accessibility of an area and what, if any, potential future impacts exist due to other remedial actions in the area. The opportunistic approach will be balanced against the ER Ranking; any time it is determined that an IHSS is impacting human health or the environment, such that immediate action is warranted, then action will be taken as soon as possible.

An updated methodology for generating this prioritized list is provided in Appendix P of the Implementation Guidance Document (RFCA, Appendix 3) and was developed by a working group composed of EPA, CDPHE, DOE RFFO, Kaiser-Hill, and RMRS staff. The methodology was implemented by RMRS staff and resulted in a prioritized list of ER locations, as well as identifying and ranking locations that require more information.

The list will be updated annually, or as significant new information becomes available. The list should continue to be evaluated as data becomes available, and should also be verified by field checks and other processes to corroborate these rankings.

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Status	Rank	IFSS Number and Name	Total Tank Contents	Total Ground Water	Total Subsurface Soil	Total Surface Soil	Total Chemical Score	ALF Score	SWI Impact Score	Potential for Further Release	Professional Judgement	Total Priority Score	Exceeds Tier 1 AL	General Comments
C-96	1	109 Ryan's Pit		33679	2	<1	33681	10	2	3	1	60	Yes	Source removed
C-96	2	110 Trench T-3		26101	1612	<1	27713	10	2	3	1	60	Yes	Source removed
C-96	3	111.1 Trench T-4		26101	78	n	26179	10	2	3	1	60	Yes	Source removed
C-96	4	108 Trench T-1		11	11080	<1	11091	9	1	3	2	54	Yes	FY98 - source removed, treatment and trench fill in FY99.
C-97	5	113 Mound		19064	6	1	19071	9	3	2	1	54	Yes	Source of Mound Plume, removed
C-97	6	112 /155/140/183 903 Pad and Lip Area		41426	1449	108	42963	10	2	2	1	40	Yes	Characterization complete FY99, remediation planned for FY2001.
IAC-99	7	East Trenches Plume		26105		2	50003521	10	3	1	1	30	Yes	Treatment cell installed 1999
IAC-98	8	118.1, 132 and 121 Tanks 9 & 10	1194	50000000	2325			10	15	2	1	30	Yes	Plume Source, sampling in progress, 899 Progress Report
IAC-98	9	Mound Plume		19067		<1	19067	9	3	1	1	27	Yes	Groundwater collection and treatment system in place
IAC-96	10	Tank T-40 within IFSS 121	3570	n	n	<1	3570	7	1	3	1	21	Yes	Source removed, tank foamed and stabilized
IAC-96	11	124, 1124, 2125 PW Tank -16N within IFSS 121	1453	<1	<1	n	1453	7	1	3	1	21	Yes	Source removed, tank foamed and stabilized
IAC-96	12	Tanks T-201-3, 122-Underground Tanks within IFSS 121	751	270	<1	29	1050	7	1	3	1	21	Yes	Source removed, tank foamed and stabilized
IAC-96	13	124.3 Process Waste Tank T-14 within IFSS 121	1000	<1	<1	n	1000	6	1	3	1	18	Yes	Source removed, tank foamed and stabilized
IAC-99	14	101 Solar Ponds		2403	<1	14	2417	7	2	1	1	14	Yes	HHRA 10-4 to 10-6, groundwater from 118.1 not used in ranking
	15	Solar Ponds Plume		2403			2403	7	2	1	1	14	Yes	Treatment cell installed 1999
	16	174(a) In PU & D Yard		340	1260	41	1641	7	1	15	1	10.5	Yes	Completed Characterization Report in 1999
	17	903 Pad & Ryan's Pit Plume		73365		n	73365	10	1	1	1	10	Yes	Impact to surface water in the Woman Creek drainage not established
	18	Carbon Tetrachloride Plume (118.1)		50000000	n	n	50000000	10	1	1	1	10	Yes	DNAPI, present, sampling in progress, 899 Progress Report
	19	881 Hillside Plume		9167	n	n	9167	8	1	1	1	8	Yes	No impact on surface water in the Woman Creek drainage
	20	Industrial Area Plume		2615	n	n	2615	7	1	1	1	7	Yes	New 1999 data-PHs in surface soil
	21	Tank T-29 (Tank 207) within IFSS 121	15	<1	<1	4110	4125	7	1	2	0.5	7	Yes	Paved
	17	160 Rad Site Bldg 664 Parking Lot		578	n	1	579	6	1	1	1	6	Yes	Source may be due to UBC at B881
	18	158 Rad Site - B551/B554		418	n	1	419	5	1	1	1	5	no	No pathway known
	19	Building 881 Area Plume		257			257	5	1	1	1	5	yes	Compliance, presumptive remedy for closure
	20	Building 881 UBC		257	7	n	254	5	1	1	1	5	no	Continued monitoring
	21	114 Present Landfill		415	<1	31	446	5	2	1	0.5	5	no	Score includes newly discovered sample data
	22	Present Landfill Area Plume		415	128	<1	415	5	2	1	1	4	yes	HHRA, less than 10-6, metals
	23	111.4 SE Trenches T-7		<1	<1	14	229	4	1	1	1	4	yes	1998 investigation-no surface water impact, cont. monitoring
	24	165 Triangle Area		215	<1		553	6	1	1	0.5	3	no	Tank foamed and stabilized, tank not breached
	25	PU&D Yard Plume		553				1	1	3	1	3	no	Tanks in service, part of NPWL
	26	129 - Tank T-4, outside steam plant	<1	n	n	2	2	1	1	3	1	3	no	Organics in groundwater
	27	126.1, 126.2 Tank T-8 within IFSS 121	<1	n	<1	<1	<1	1	1	3	1	3	no	Contamination due to B779
	28	111.8 Trench T-11		96	<1	<1	96	3	1	1	1	3	no	PAHs in surface soil
	29	Building 779 UBC		n	n	64	64	2	1	1	1	2	no	To be characterized in 2003
	30	Tank T-27 within IFSS 121		n	n	59	59	2	1	1	1	2	no	Overlaps Solar Ponds Area (IFSS 101)
	31	143 771 Outfall		46	<1	3	49	2	1	1	1	2	no	OU-5 HHRA, 10E-4 to 10-6
	32	176 SAV Yard		n	n	26	26	2	1	1	1	2	no	OU-5 HHRA, 10E-4 to 10-6
	33	131 Rad Site #1 - 700 Area		n	n	4	4	1	1	2	1	2	no	OU-5 HHRA, 10E-4 to 10-6
	34	133.4 Ash Pit #4		44	<1	2	46	2	1	1	1	2	no	OU-5 HHRA, 10E-4 to 10-6
	35	133.1 Ash Pit #1		44	2	<1	46	2	1	1	1	2	no	OU-5 HHRA, 10E-4 to 10-6
	36	133.2 Ash Pit #2		44	2	<1	46	2	1	1	1	2	no	OU-5 HHRA, 10E-4 to 10-6
	37	133.3 Ash Pit #3		44	<1	<1	44	2	1	1	1	2	no	OU-5 HHRA, 10E-4 to 10-6
	38	Old Landfill Area Plume		174			174	4	1	1	0.5	2	no	OU-5 HHRA, 10E-4 to 10-6
	39	115 Original Landfill		172	<1	27	199	4	1	1	0.5	2	no	OU-5 HHRA, 10E-4 to 10-6, Action required due to physical hazard
	40	Bowman's Pond (PAC 700-1108), 139, 11N(e) tanks spill		n	14	36	50	2	1	1	0.5	1	no	Investigation complete-1999 Solar Ponds cell to treat water
	41	190 Caulistic Leak		12	n	<1	12	1	1	1	1	1	no	Evaluate using approved NAFMA process
	42	Building 123 Site (IHSSs 146, 121, 123UBC, RCRA Unit 40)		9	4	1	14	1	1	1	1	1	no	Building removed to the slab in FY98
	43	120.1 North Fiberglassing area		n	n	20	20	1	1	1	1	1	no	Contamination probably from 400 Complex
	44	150.3 Rad Site Between B771 & B774		n	n	16	16	1	1	1	1	1	no	
	45	214 750-Pad pond/crystallite storage		n	n	13	13	1	1	1	1	1	no	
	46	157.1 Rad Site North-Central Ave Ditch		5	n	5	10	1	1	1	1	1	no	Active RCRA unit

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1 of 5

DATA RECORD

n = not characterized

SW-A-004039

ER Ranking

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Status	Rank	IHSS Number and Name	Total Tank Contents	Total Ground Water	Total Subsurface Soil	Total Surface Soil	Total Chemical Score	ALF Score	SW Impact Score	Potential for Further Release	Professional Judgement	Total Priority Score	Exceeds Tier I AL	General Comments
	47	157.2 Rad Site south		2	n	5	7	1	1	1	1	1	no	PCB hit above AL, listed under PCB 9.
	48	120.2 West Fiberglassing Area	n	n	n	6	6	1	1	1	1	1	no	
	49	144 Sewer line overflow	n	n	n	4	4	1	1	1	1	1	no	
	50	136.2 Cooling Tower Pond East of B444	n	n	n	4	4	1	1	1	1	1	no	
	51	163.1 Rad Site 700 North B774	n	n	n	2	2	1	1	1	1	1	no	
	52	Building 440 Site	n	n	8	n	8	1	1	1	1	1	no	
	53	177-OU 10	<1	n	n	2	2	1	1	1	1	1	no	
	54	196 in Old Landfill	44	<1	<1	44	44	2	1	1	1	1	no	Data from "Analysis of Soils East of Bldg 440", August 1998
	55	119.1 - OU 1 - Solvent Still Site	29	n	n	3	32	2	1	1	0.5	1	no	PCB hit above AL
	56	139.2 Hydrofluoric Acid Tank spils	n	n	19	19	19	1	1	1	0.5	1	no	HHRA, 10E-4 to 10-6
	57	111.2 Trench T-5	<1	n	<1	1	1	1	1	1	0.5	0.5	no	CAD/CROD amendment pending
	58	153 Oil Burn Pit	<1	<1	n	1	1	1	1	1	0.5	0.5	no	PAHs in surface soil
	59	164.3 Rad Site #2 800 A via, 887 Pad	n	n	<1	n	<1	0	1	1	1	0	no	Under PA fence
	60	127 Low level Rad waste leak	n	n	n	<1	<1	0	1	1	1	0	no	
	61	186 Valve Vault 11, 12 and 13	n	n	n	<1	<1	0	1	1	1	0	no	
	62	150.4 Rad Site NW of B790	n	n	n	<1	<1	0	1	1	1	0	no	
	63	159 Rad Site B559	n	n	<1	<1	<1	0	1	1	1	0	no	Associated with NPWL
	64	111.3 SE Trenches T-6	<1	n	n	<1	<1	0	1	1	1	0	no	
	65	111.5 SE Trenches T-8	<1	n	<1	<1	<1	0	1	1	1	0	no	
	66	111.6 SE Trenches T-9	<1	n	<1	<1	<1	0	1	1	1	0	no	
	67	138 Bldg 779 Cooling Tower Blowdown	n	n	<1	<1	<1	0	1	1	1	0	no	
	68	164.2 Rad Site #2, 800 Area, Bldg 886 Spill	<1	n	<1	<1	<1	0	1	1	1	0	no	
	69	111.7 SE Trenches T-10	n	td	td	<1	<1	0	1	1	1	0	no	
	70	137 Bldg 712/713 Cooling Tower Blowdown	n	n	n	n	<1	0	1	1	1	0	no	
	71	118.2 Solvent Spills North End of Bldg. 707	<1	n	n	<1	0	0	1	1	1	0	no	
	72	121-PO8 OPWL Pipeline, 135 ft. Bldg. 881	n	n	n	0	0	0	1	1	1	0	no	Evaluate using approved NAFNA process
	73	121-PS7 OPWL Pipeline, 112 ft. Bldg. 122	n	n	n	0	0	0	1	1	1	0	no	Evaluate using approved NAFNA process
	74	Tank 12 within IHSS 121	n	n	n	0	0	0	1	1	1	0	no	Evaluate using approved NAFNA process
	75	Tank 31 within IHSS 121	n	n	n	0	0	0	1	1	1	0	no	Evaluate using approved NAFNA process
	76	Tank 33 within IHSS 121	n	n	n	0	0	0	1	1	1	0	no	Evaluate using approved NAFNA process
	77	Tank 34 within IHSS 121	n	n	n	0	0	0	1	1	1	0	no	Evaluate using approved NAFNA process
	78	Tank 35 within IHSS 121	n	n	n	0	0	0	1	1	1	0	no	Evaluate using approved NAFNA process
	79	175 S&W B.980 Container Storage Facility	n	n	n	0	0	0	1	1	1	0	no	Evaluate using approved NAFNA process
	80	182 444/453 Drum Storage Area	n	n	<1	0	0	0	1	1	1	0	no	Evaluate using approved NAFNA process
	81	205 Sump #3 Acid Site, SE B460	n	n	n	0	0	0	1	1	1	0	no	Evaluate using approved NAFNA process
	82	206 Inactive D-386 HW Tank B374	n	n	<1	0	0	0	1	1	1	0	no	Evaluate using approved NAFNA process
	83	207 Inactive B444 Acid Dumpsters	n	n	<1	0	0	0	1	1	1	0	no	Evaluate using approved NAFNA process
	84	208 Inactive 444/447 Waste Storage.	n	n	<1	0	0	0	1	1	1	0	no	Evaluate using approved NAFNA process
	85	187 Sulfuric Acid Spill, B443	n	n	<1	0	0	0	1	1	1	0	no	Evaluate using approved NAFNA process
	86	134(N) Lithium Metal Destruction Site	<1	n	n	0	0	0	1	1	1	0	no	Evaluate using approved NAFNA process
	87	134(S) Lithium Metal Destruction Site	n	<1	<1	0	0	0	1	1	1	0	no	Evaluate by NAFNA process B335 D&D
	88	150.6 Loading Dock	n	n	<1	0	0	0	1	1	1	0	no	Evaluate by NAFNA process B335 D&D
	89	154 Pallet Burn Site	n	n	<1	0	0	0	1	1	1	0	no	Evaluate with NAFNA/PCB Hot Spot only
INV		171 Fire Training							1	1	0.5	0		Removed during PA construction, verify only
INV		Building 444 UBC	134	n	<1	134	4	4	1	2	2	16	no	Empirical data indicates free product present
INV		Building 707 UBC	156	n	<1	156	4	4	1	1	2	8		Known contaminant plume
INV		121 Old Process Waste Lines (OPWL)	142	n	<1	0	1	1	1	1	2	2		Many known spills
INV		86 segments (35,000') & 22 tanks within IHSS 121	n	n	n	0	7	7	1	1	2	14	yes	IHSS 121 to be characterized in 2004
INV		123.2 Valve Vault w/ of 707 within IHSS 121												Not characterized, probably highly contaminated
INV		147.1 MAAS Area within IHSS 121												Not characterized, probably highly contaminated

September 30, 1999

n = not characterized

ER Ranking

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Status	Rank	IHSS Number and Name	Total Tank Contents	Total Ground Water	Total Subsurface Soil	Total Surface Soil	Total Chemical Score	ALF Score	SW Impact Score Multiplier	Potential for Further Release Multiplier	Professional Judgement Multiplier	Total Priority Score	Exceeds Tier I AL	General Comments
INV	149.1	OPWL to SEPS within IHSS 121												Not characterized, probably highly contaminated
INV	149.2	OPWL to SEPS within IHSS 121												Not characterized, probably highly contaminated
INV	215	Abandoned sump in 774 within IHSS 121												Not characterized, probably highly contaminated
INV		New Process Waste Lines (PAC-000-504)												To be characterized in 2003
INV		Storm Drains (PAC-000-105)												To be characterized in 2003
INV		Firing Range and Target Area												Not characterized, Pb Present and possibly depleted U
INV	142.1	Pond A-1	n	n	n	n	n	0	1	2	1	?		OU-8 HHRA, 10E-4 to 10-6 risk, disposition after IA D&D
INV	142.10	Pond C-1	n	n	<1	<1	0	0	1	1	0.5	0		OU-6 HHRA, less than 10-6 risk, disposition after IA D&D
INV	142.11	Pond C-2	n	n	<1	<1	0	0	1	1	0.5	0		OU-6 HHRA, less than 10-6 risk, disposition after IA D&D
INV	142.12	Walnut and Indian a Pond	<1	<1	<1	<1	0	0	1	1	0.5	0		OU-6 HHRA, 10E-4 to 10-6 risk, disposition after IA D&D
INV	142.2	Pond A-2	n	n	<1	<1	0	0	1	1	0.5	0		OU-6 HHRA, 10E-4 to 10-6 risk, disposition after IA D&D
INV	142.3	Pond A-3	n	n	<1	<1	0	0	1	1	0.5	0		OU-6 HHRA, 10E-4 to 10-6 risk, disposition after IA D&D
INV	142.4	Pond A-4	<1	<1	<1	<1	0	0	1	1	0.5	0		OU-6 HHRA, 10E-4 to 10-6 risk, disposition after IA D&D
INV	142.5	Pond B-1	n	n	<1	<1	0	0	1	1	0.5	0		Passed CDPHE screen w/ pond and sediment data
INV	142.6	Pond B-2	n	n	<1	<1	0	0	1	1	1	0		OU-6 HHRA, 10E-4 to 10-6 risk, disposition after IA D&D
INV	142.7	Pond B-3	n	n	<1	<1	0	0	1	1	1	0		OU-6 HHRA, 10E-4 to 10-6 risk, disposition after IA D&D
INV	142.8	Pond B-4	n	n	<1	<1	0	0	1	1	1	0		OU-6 HHRA, 10E-4 to 10-6 risk, disposition after IA D&D
INV	142.9	Pond B-5	<1	<1	<1	<1	0	0	1	1	1	0		OU-6 HHRA, 10E-4 to 10-6 risk, disposition after IA D&D
INV		Bldg 774 UBC (146.1, 146.2, 146.3, 146.4, 146.5, 146.6)	n	n	n	n	0	0	1	1	2	0		OU-6 HHRA, 10E-4 to 10-6 risk, disposition after IA D&D
INV	150.1	Rad Site N of 771	n	n	n	<1	0	0	1	1	1	0		Tanks removed, 1971 rad. data exceeded Tier I levels
INV	150.2	Rad Site W of 771, 776	n	n	n	<1	0	0	1	1	1	0		Paved, old data exists
INV	117.1	North Site A 1978 Strap Metal Storage	n	n	n	<1	0	0	1	1	1	0		Paved, old data exists
INV	161 - W. of 664		n	n	n	<1	0	0	1	1	2	0		Suspected source known buried material
INV	117.2	Middle Site Chemical Storage	651	n	n	<1	651	6	1	1	1	6	yes	Waste staging area-lack of data
INV	128	Oil Burn Pit #1	<1	n	n	<1	0	0	1	1	1	0		Source
INV	150.7	Rad Site S. of 778	n	n	n	<1	0	0	1	1	1	0		Tied to Building 335 D&D Project
INV	163.2	Americium Slab	n	n	n	<1	0	0	1	1	1	0		Rad Screens only
INV	213	904 Pad: Ponderole Storage	n	n	n	n	0	0	1	1	1	0		HPGs Survey
INV	116.1	Bldg 447, W. Loading Dock	n	n	n	<1	0	0	1	1	1	0		Active RCRA Unit, not sampled
INV	116.2	Bldg 444, S. Loading Dock	n	n	n	<1	0	0	1	1	1	0		
INV	136.1	Cooling Tower Poni W. of 444	n	n	n	<1	0	0	1	1	1	0		
INV	148	Waste Leaks	n	n	n	<1	0	0	1	1	1	0		
INV	150.8	Rad Site S. of 779	n	n	n	<1	0	0	1	1	1	0		Associated with UBC at 123 slabs
INV	173	Rad Site Bldg 991	n	n	n	<1	0	0	1	1	1	0		Spills cleaned up at time
INV	184	Rad Site 991 Steam	n	n	n	<1	0	0	1	1	0.5	0		Spills cleaned up at time
INV	162 - 700	Area	n	n	n	<1	0	0	1	1	0.5	0		Unconfirmed-no location found
INV		PAC 900-1307 Explosive Loading Pit	n	n	n	n	0	0	1	1	1	0		Spills cleaned up at time
NFA														U alloy used in pit, no data, tied to Bldg 993 D&D
NFA		PAC NW-1501 Asbestos boiler 1 PU&D Yard												
NFA		PAC NE-1408 OU-2 Test Mail	n	n	n	<1	0	0	1	1	0.5	0		Sampled 1989, evaluated using approved NAF&A process
NFA		PAC NE-1409 Interceptor Trench Pump House	n	n	n	<1	0	0	1	1	0.5	0		Sampled 1989, evaluated using approved NAF&A process
NFA		PAC 900-1309 OU-2 Field Treatability Unit	n	n	<1	<1	0	0	1	1	0.5	0		Sampled 1989, evaluated using approved NAF&A process
NFA		PAC 900-1311 Septic Tank East of Building 991	n	n	<1	<1	0	0	1	1	0.5	0		Sampled 1989, evaluated using approved NAF&A process
NFA		PAC 900-1312 OU-2 waste Spill	n	n	<1	<1	0	0	1	1	0.5	0		Sampled 1989, evaluated using approved NAF&A process
NFA		PAC 900-1313 Steep Area Near OU-2 Influent Piping	n	n	<1	<1	0	0	1	1	0.5	0		Sampled 1989, evaluated using approved NAF&A process
NFA		164.1 Rad Site #2 - 800 Area	2	n	n	<1	2	1	1	1	0.5	0	no	Investigation in FY98 determined no source above Tier I present/NFA
NFA		170. 174.2 (174b) PU&D Storage Areas	n	n	n	12	12	1	1	1	0.5	0.5	no	Evaluated using existing data and approved NAF&A process
NFA		117.3 S Chemical Storage Site	n	n	n	<1	0	0	1	1	1	0		Evaluated using existing data and approved NAF&A process
NFA		123.1 Valve Vault #7	n	n	n	<1	0	0	1	1	1	0		Evaluated using existing data and approved NAF&A process
NFA		135 Bldg 337 Cooling Tower	n	n	n	<1	0	0	1	1	1	0		Evaluated using existing data and approved NAF&A process
NFA		147.2 Bldg 881 Conversion Activity	n	n	n	<1	0	0	1	1	1	0		Evaluated using existing data and approved NAF&A process
NFA		151 Fuel Oil Leak	n	n	n	<1	0	0	1	1	1	0		Evaluated using existing data and approved NAF&A process

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Status	Rank	HHSS Number and Name	Total Tank Contents	Total Ground Water	Total Subsurface Soil	Total Surface Soil	Total Chemical Score	ALF Score	SW Impact Score Multiplier	Potential for Further Release Multiplier	Professional Judgement Multiplier	Total Priority Score	Exceeds Tier 1 AL	General Comments
NFA		156.1 Radioactive Site		n	n	<1	0	0	1	1	1	0		Evaluated using existing data and approved NAFNA process
NFA		172 Central Avenue Waste Spill		n	n	<1	0	0	1	1	1	0	no	Evaluated using existing data and approved NAFNA process
NFA		181 Building 334 Cargo Container Area		n	n	<1	0	0	1	1	1	0		Evaluated using existing data and approved NAFNA process
NFA		188 Acid Leak Southeast of Bldg. 374		n	n	<1	0	0	1	1	1	0		Evaluated using existing data and approved NAFNA process
NFA		191 Hydrogen Peroxide Leak		n	n	<1	0	0	1	1	1	0		Evaluated using existing data and approved NAFNA process
NFA		210 Bldg 980 Cargo Container		n*	n	<1	0	0	1	1	1	0		Evaluated using existing data and approved NAFNA process
NFA		216.2 East Spray Field - OU 2		n*	n	<1	0	0	1	1	1	0		Evaluated using existing data and approved NAFNA process
NFA		216.3 East Spray Field - OU 2		n*	n	<1	0	0	1	1	1	0		PPRG ratio less than 1, 2 downgradient wells
NFA		133.5 Incinerator		n	<1	<1	0	0	1	1	1	0		PPRG ratio less than 1, 2 downgradient wells
NFA		133.6 Concrete Wash Pad		n	<1	<1	0	0	1	1	1	0		OU-5 HHRA, 10E-4 to 10-6
NFA		141 Sludge Disposal Area		n	<1	<1	0	0	1	1	1	0		OU-5 HHRA, 10E-4 to 10-7
NFA		152 Fuel Oil Tank 221 Spill		n	n	<1	0	0	2	1	0.5	0		OU-5 HHRA, less than 10-6
NFA		156.2 Soil Disposal Area		n	n	<1	0	0	1	1	1	0		Evaluated using existing data and approved NAFNA process
NFA		166.1 Landfill Trench A		<1	<1	n	0	0	1	1	1	0		OU-6 HHRA, less than 10-6
NFA		166.2 Landfill Trench B		<1	<1	n	0	0	1	1	1	0		OU-7 REIRI Passed CDPHE screen
NFA		166.3 Landfill Trench C		<1	<1	n	0	0	1	1	1	0		OU-7 REIRI Passed CDPHE screen
NFA		167.1 N Landfill Spray Area		<1	<1	n	0	0	1	1	1	0		OU-7 HHRA, less than 10-6
NFA		167.2 Landfill Pond Spray Area		n	<1	<1	0	0	1	1	1	0		OU-7 HHRA, 10E-4 to 10-6
NFA		167.3 Landfill South Spray Area		n	<1	<1	0	0	1	1	1	0		OU-7 focused HHRA, 10E-4 to 10-6
NFA		169 Hydrogen Peroxide Spill		n	n	<1	0	0	1	1	1	0		Evaluated using existing data and approved NAFNA process
NFA		183 Gas Delox Facility		n	n	n	0	0	1	1	1	0		Evaluated using existing data and approved NAFNA process
NFA		189 Nitric Acid Tank		n	n	n	0	0	1	1	1	0		Evaluated using existing data and approved NAFNA process
NFA		203 Inactive Hazardous Waste Storage Area		n	n	n	0	0	1	1	1	0		Evaluated using existing data and approved NAFNA process
NFA		209 Surface Disturbances		n	n	<1	0	0	1	1	1	0		Evaluated using existing data and approved NAFNA process
NFA		216.1 East Spray Field - CU 6		n	<1	<1	0	0	1	1	1	0		Evaluated using existing data and approved NAFNA process
NFA		F167.3 Former S. Spray Field		n	<1	<1	0	0	1	1	1	0		Passed CDPHE screen
C-97		102 Oil Sludge Pit		<1	<1	<1	0	0	1	1	1	0		OU-6 REIRI Passed CDPHE screen
C-97		103 Chemical Bural		<1	<1	<1	<1	0	2	1	0.5	0		Passed CDPHE screen
C-97		104 Liquid Dumping		<1	<1	<1	<1	0	2	1	0.5	0		OU-1 NFA CAD/ROD complete
C-97		105.1 W Out-of-Service Fuel Tank		<1	10	<1	10	4	2	1	0.5	0		OU-1 NFA CAD/ROD complete
C-97		105.2 E Out-of-Service Fuel Tank		<1	<1	<1	0	0	2	1	0.5	4	yes	OU-1 NFA CAD/ROD complete
C-97		106 Outfall		<1	<1	<1	0	0	2	1	0.5	0		OU-1 NFA CAD/ROD complete
C-97		107 Hillside Oil Leak		<1	<1	<1	0	0	2	1	0.5	0		OU-1 NFA CAD/ROD complete
C-97		119.2 Solvent Spill Site		<1	<1	<1	0	0	2	1	0.5	0		OU-1 NFA CAD/ROD complete
C-97		130 800 Area Rad Site #1		9	<1	<1	9	0	2	1	0.5	0		OU-1 NFA CAD/ROD complete
C-97		145 Sanitary Waste Line Leak		<1	34	<1	34	1	2	1	0.5	1	no	OU-1 NFA CAD/ROD complete
C-97		199 Offsite Land Surface		<1	<1	<1	0	2	2	1	0.5	2	yes	OU-1 NFA CAD/ROD complete
C-97		200 Great Western Reservoir		n	<1	<1	0	0	1	1	0.5	0		OU-1 NFA CAD/ROD complete
C-97		201 Standley Lake		<1	<1	<1	0	0	1	1	0.5	0		OU-1 NFA CAD/ROD complete
C-97		202 Mower Reservoir		<1	<1	<1	0	0	1	1	0.5	0		OU-3 NFA CAD/ROD complete
C-95		168 West Spray Field		<1	<1	<1	0	0	1	1	0.5	0		OU-3 NFA CAD/ROD complete
C-95		178 B881 Drum Storage, Rtn. 165	190	<1	<1	<1	190	4	1	1	0.5	0		OU-3 NFA CAD/ROD complete
C-95		179 B865 Drum Storage, Rtn. 145	n	n	n	n	0	0	1	1	0.5	2	no	OU-11 NFA CAD/ROD complete
C-95		180 B883 Drum Storage, Rtn. 104	n	n	n	n	0	0	1	1	0.5	0		OU-15 NFA CAD/ROD complete
C-95		204 Original Uranium Cliff, Roaster	n	n	n	n	0	0	1	1	0.5	0		OU-15 NFA CAD/ROD complete
C-95		211 B881 Drum Storage #2, R211	n	n	n	n	0	0	1	1	0.5	0		OU-15 NFA CAD/ROD complete
C-94		217 B881 Cyanide Treatment - #32	n	n	n	n	0	0	1	1	0.5	0		OU-15 NFA CAD/ROD complete
C-94		185 Solvent Spill	n	n	n	n	0	0	1	1	0.5	0		OU-15 NFA CAD/ROD complete
C-94		192 Anti-freeze spill	n	n	n	n	0	0	1	1	0.5	0		OU-15 NFA CAD/ROD complete
C-94		193 Steam Condensate	3	n	n	n	3	1	1	1	0.5	0		OU-16 NFA CAD/ROD complete
C-94		194 Solvent Spill	n	n	n	n	0	0	1	1	0.5	0.5	no	OU-16 NFA CAD/ROD complete

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n = not characterized

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C-94		195 Nickel Carbonyl Disposal		n	n	n	0	0	1	1	0.5	0		OU-16 NFA CAD/ROD complete
C-96		Closure complete												
IAC-96		Interim Action Complete												
NFA		Evaluated and recommended for NFA/NFA status												
INV		Needs further investigation												
LOW		Low priority												